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BRILLION WATERSHED Calumet and Manitowoc Counties, Wisconsin

Final Environmental Impact Statement

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State Conservationist
Soil Conservation Service

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Sponsoring Local Organization

Calumet County Soil and Water Conservation District Courthouse Chilton, Wisconsin 53014

Manitowoc County Soil and Water Conservation District
County Building
1701 Michigan Avenue
Manitowoc, Wisconsin 54220

January 1975

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USDA ENVIRONMENTAL IMPACT STATEMENT

Brillion Watershed Project

Calumet and Manitowoc Counties, Wisconsin

Prepared in Accordance with Sec. 102(2) (C) of Public Law 91-190

Summary Sheet

- I Final
- II Soil Conservation Service
- III Administrative
- IV <u>Description of Project Purpose and Action</u>: A project of watershed protection and flood prevention in Calumet and Manitowoc Counties, Wisconsin, to be implemented under authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress, 68 Stat. 666), as amended.
- Summary of Environmental Impact: The project will reduce the average annual rate of erosion from cropland from 3.1 to 2.8 tons per acre per year. The amount of sediment reaching Spring Creek will be reduced by 2,600 tons per year. Structural measures will reduce floodwater and sediment damages by 51 percent in agricultural areas below structures and by 99 percent in nonagricultural areas. A 48-acre sediment pool with a 1.9-mile shoreline will be created. The level of Long Lake will be stabilized resulting in reduced flooding of 51 properties. Flooding will be eliminated or reduced for 38 homes, 18 commercial buildings, and 3 agricultural properties along Spring Creek. Approximately 90 acres of land will be used for dams, spillways, and sediment pools and another 131 acres may be flooded during storms. Two miles of intermittent stream will be covered or inundated by the structures. One-half mile of intermittent stream will be disturbed by the Long Lake structure. One mile of Spring Creek will receive warmer water from FRS No. 1. The structures will destroy 8 acres of wetland and inundate another 35 acres. The level of Long Lake will be lowered by 0.3 foot.

-Summary-

VI Alternatives:

- 1. Continuation of the present trends.
- 2. Accelerated land treatment only.
- 3. Accelerated land treatment, flood plain zoning, and floodproofing of existing buildings subject to flood damage.
- 4. Accelerated land treatment, flood plain zoning, and flood plain evacuation.
- 5. Accelerated land treatment, flood plain zoning, one floodwater retarding structure, Long Lake outlet structure, and construction of a bypass channel to divert Spring Creek around Brillion.
- 6. Accelerated land treatment, flood plain zoning, two floodwater retarding structures, Long Lake outlet structure, and channel work on Spring Creek.
- 7. Accelerated land treatment, flood plain zoning, two floodwater retarding structures; Long Lake outlet structure, and a multiple-purpose flood control and agricultural water management channel.

VII Agencies From Which Written Comments Have Been Received:

- 1. U.S. Department of the Army
- 2. U.S. Department of Health, Education, and Welfare
- 3. U.S. Department of the Interior
- 4. U.S. Department of Transportation
- 5. U.S. Environmental Protection Agency
- 6. Advisory Council on Historic Preservation
- 7. Wisconsin Board of Soil and Water Conservation Districts
- 8. Wisconsin Department of Administration
- 9. Wisconsin Department of Natural Resources

VIII Draft Statement Transmitted to the Council on Environmental Quality on October 25, 1974.

USDA SOIL CONSERVATION SERVICE

ENVIRONMENTAL IMPACT STATEMENT

for

Brillion Watershed

Calumet and Manitowoc Counties, Wisconsin

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public Law 83-566, 83d Congress, 68 Stat. 666, as amended.

SPONSORING LOCAL ORGANIZATION

The Calumet and Manitowoc County Soil and Water Conservation Districts are the sponsoring local organization for the proposed project measures.

PROJECT PURPOSES

The goals of the local sponsoring organizations include watershed protection, flood prevention, and fish and wildlife improvement. In the process of planning to meet these goals, the Calumet and Manitowoc County Soil and Water Conservation Districts and the Soil Conservation Service have agreed to combine land treatment and structural measures that will maintain the natural environment in a quality condition.

Watershed Protection

The goal for watershed protection is to have a minimum of 70 percent of the watershed protected by the end of the 4-year installation period. This is a realistic goal based on current treatment levels, general acceptance, and the financial ability of individual landowners to install needed practices. Approximately 2,060 acres of cropland, 1,020 acres of grassland, 637 acres of forest land, and 543 acres of other land are now protected.

The primary goal of watershed protection is to reduce gross soil erosion. Average sheet erosion from cropland is currently 3.1 tons per acre per year. The objective is to reduce this to an allowable soil loss 1/ averaging 2.8 tons per acre per year or less.

Other objectives include a reduction in sediment movement and deposition, increased water retention for better crop production; reduced runoff to decrease frequency and severity of floods, water pollution control, and fish and wildlife habitat improvement.

The goal for fish and wildlife improvement is to improve existing fish habitat in watershed streams and to maintain and improve wetland and upland wildlife habitat.

One goal is to install wildlife habitat improvement and management practices on an additional 900 acres of upland and wetland during the 4-year installation period. Other goals include preserving and improving existing stream habitat by reducing erosion, sedimentation, and pollution.

Flood Prevention

The goal for flood prevention is to reduce the frequency of flooding and the area subject to flooding for different flood events. The primary objective of flood prevention is to reduce flooding in Brillion and around Long Lake. The average level of protection desired is to reduce frequency from once in 5 years to once in 100 years or less. Reduction in erosion and sedimentation are related goals.

Present and future damage reduction in agricultural areas is an additional flood prevention goal.

Allowable soil loss is the amount of soil that can be lost in tons per acre per year while maintaining a high level of productivity indefinitely.

PLANNED PROJECT

Land Treatment Measures

Resource conservation plans developed for the operating units of the 13,811-acre watershed and implemented on individual land units will provide for the proper use and management of the land. 1/See Project Map, appendix B, figure 6.

A combination of land treatment measures will be applied by individual farm operators or owners for the purpose of soil and water conservation, particularly in the upland areas. In order to adequately protect the watershed, the Calumet and Manitowoc County Soil and Water Conservation District programs will continue to stress the application and maintenance of conservation practices. This includes the management and use of land within its capabilities and treatment in accordance with its needs.

Soil surveys in the Brillion watershed have been completed. Soil survey information is expected to be published in an interim soil survey report by June 1975.

An accelerated program of land treatment measures is planned during the 4-year project installation period. Thirty-three percent of the upland area will be adequately treated during this period.

Approximately 2,060 acres of cropland, 1,020 acres of grassland, 543 acres of other land, and 637 acres of forest land are now adequately protected. Within the 4-year project period, an additional 3,000 acres of cropland, 200 acres of grassland, 700 acres of other land, and 726 acres of forest land will be treated.

Amounts of land treatment measures to be applied during the 4-year project installation period were determined by the district supervisors and the directors of the watershed association based on recommendations of the Soil Conservation Service, U.S. Forest Service, and the Wisconsin Department of Natural Resources.

^{1/} All information and data, except as otherwise noted by reference to source, were collected during the watershed planning investigation by the Soil Conservation Service and Forest Service, U.S. Department of Agriculture.

-Planned Project-

Land treatment measures to be applied on cropland, grassland, forest land, and other land (building sites, roads, etc.) include; conservation cropping systems, contour farming, diversions, drainage field ditches, stabilization structures, grassed waterways and outlets, ponds, streambank protection, stripcropping, subsurface drain, terracing, tree planting, wildlife wetland and upland habitat management, and woodland improvement.

A conservation cropping system is growing crops in combination with needed cultural and management measures. Cropping systems include rotations that contain grasses and legumes as well as rotations in which the desired effects are achieved without the use of such crops. Conservation cropping systems reduce soil losses and thus improve water quality, enhance natural beauty, and improve fish and wildlife habitat.

Contour farming is farming sloping cultivated land in such a way that plowing, preparing land, planting, and cultivating are done on the contour. This includes following established grades of terraces or diversions.

A diversion is a channel with a supporting ridge on the lower side constructed across the slope. It is designed to carry runoff to an area with a suitable outlet. Diversions are frequently used to provide protection to farm buildings and other developments.

A drainage field ditch is a graded ditch for collecting excess water within a field.

Grade stabilization structures are used to stabilize the channel grade and to control erosion (head cutting) in natural or artificial watercourses. They prevent the advance of gullies and improve fish and wildlife habitat by reducing sedimentation and by making conditions more favorable for establishing vegetation.

A grassed waterway or outlet is a natural or constructed waterway or outlet shaped or graded and established in suitable vegetation as needed for the safe disposal of runoff from a field, diversion, terrace, or other structure. Grassed waterways along with other conservation practices prevent or heal gullies. They can provide field edge for year-round use by wildlife. Properly maintained waterways make good nesting sites for ground nesting birds.

A pond is a water impoundment made by constructing a dam or embankment, or by excavating a pit or dugout. It creates fish and wildlife habitat in the form of open water or wetlands.

Streambank protection is stabilizing and protecting banks of streams or excavated channels against scour and erosion by vegetative or structural means. This improves fish and wildlife habitat by reducing sedimentation and by establishing vegetation on channel banks. Natural beauty is also enhanced.

Stripcropping is growing crops in a systematic arrangement of strips or bands on the contour or across the general slope to reduce water erosion. The crops are arranged so that a strip of grass or closegrowing crop is alternated with a strip of clean-tilled crop or fallow, or a strip of grass is alternated with a close-growing crop. Runoff is slowed down and reduced by stripcropping.

A subsurface drain is a conduit, such as tile, pipe, or tubing, installed beneath the ground surface to collect and convey drainage water.

A terrace is an earth embankment or a ridge and channel constructed across the slope at a suitable spacing. It has no grade (level terrace) or an acceptable grade (gradient terrace). Terraces carry water to a grassed waterway or other suitable outlet for safe disposal. Terracing breaks up long slopes into shorter slopes. It reduces erosion and increases infiltration of water into the soil.

Tree planting is planting tree seedlings or cuttings. Forest land protected from grazing and burning soaks up more rainfall and produces less erosion.

Wildlife habitat improvement and management is retaining, creating, or managing wildlife habitat. The habitat may be upland or wetland habitat.

Woodland improvement is removing unmerchantable or unwanted trees, shrubs, or vines from woodland.

A typical combination of practices on sloping cropland fields will be contour stripcropping, conservation cropping systems, terraces, and grassed waterways. On gentle slopes alternatives to contour stripcropping are the use of terraces with contour farming.

-Planned Project-

The land treatment measures are based on present and projected land uses. If the future land use differs appreciably from that expected, alternative land treatment measures that will accomplish the same purposes will be installed. These changes, if necessary, will be made during project installation and will become a part of the county soil and water conservation district long-range program.

The total cost of installing these measures, including the cost of technical assistance, is estimated at \$213,560.

Structural Measures

Structural measures are needed in addition to land treatment measures to reduce flood peaks on residential, industrial, and other lands adjacent to Spring Creek and its tributaries. The proposed structural measures consist of two floodwater retarding structures and a water level control structure. The location of these measures are shown on figure 6, Project Map in appendix B. Structural details are shown on figures 1, 2, and 3 in appendix B.

The two floodwater retarding sites (FRS) are located above Brillion. FRS No. 1 is located in the northeast quarter of section 23, 20 N., R. 20 E. FRS No. 2 is located in the northwest quarter of section 25, T. 20 N., R. 20 E. The two structures will consist of earthfill dams with reinforced concrete pressure pipe principal spillways and vegetated earth emergency spillways.

FRS No. 1 will have a maximum height of about 19 feet and a length of 840 feet. The centerline is located across a relatively narrow gap of Spring Creek with somewhat concave valley sides. The dam is supplemented by a 2,640-foot long saddle dike on the west side.

FRS No. 2 will have a maximum height of about 17 feet and a length of 800 feet. The site is located at a broad flared gap on an unnamed intermittent stream. The slopes are hayland.

The embankments and principal spillways for FRS No. 1 and No. 2 will be on foundations classified as yielding. Slight consolidation is expected. There are no rock outcrops in the vicinity of the centerlines.

At FRS No. 2 about 60 feet of land on the right side of the stream is underlain by a combination of silt, clay, and peat with low bearing capacity. This material will be removed and replaced.



THE CENTERLINE OF FLOODWATER RETARDING SITE NO. 1 IS LOCATED 270 FEET UPSTREAM (LEFT) OF HACKER ROAD



THE LONE TREE IS ON THE CENTERLINE OF FLOODWATER RETARDING STRUCTURE NO. 2.

-Planned Project-

An ample supply of good quality low plastic clay fill material is available for the embankments. The borrow areas are on ground moraine of the Valders till sheet of the Wisconsin Stage of Pleistocene glaciation.

Borrow for embankment fill for FRS No. 1 will be taken from areas adjacent to both abutments upstream from the centerline. Most of the borrow material for FRS No. 2 will be taken from the emergency spillway. The remainder will be taken from the abutment area downstream from the emergency spillway.

Borrow depths will be limited to avoid the highly dispersed materials of the underlying Cary till. Borrow areas will be revegetated. Bedrock should not be encountered.

Most of the borrow will be within the area required for the structure and flood pool. Additional land rights will be needed for the remainder of the borrow.

The principal spillways and retarding storage will control the runoff resulting from a flood occurring on the average of once in 100 years (100-year flood). The principal spillways will be 30-inch diameter reinforced concrete pressure pipe outlets. FRS Nos. 1 and 2 have modified single-stage risers. See figure 1 for details. The outlets of the conduits will be cantilever beams with pipe supports. Energy from flows will be dissipated in plunge pools. The modified inlet will permit the structures to be operated with a dry or wet sediment pool for wildlife (waterfowl) purposes. Both structures will be designed for wet sediment pool conditions. FRS No. 1 will have a wet sediment pool. No recreational facilities are planned for this shallow sediment pool. Public use will be allowed. Some incidental recreation such as hunting may occur. Public access to the wet pool is available at Harvestore and Hacker Roads. Sanitary facilities will be provided as required by State and local health agencies. The dry sediment pool of FRS No. 2 will provide additional flood retarding storage until gradually displaced over the design life by sediment. Negligible or no recreational opportunities exist at this site.

The sediment pool is an area allocated to the storage of sediment expected to be deposited throughout the design life of the structure (100 years). Initially, this sediment pool area may be used to store water by closing a water control gate. By opening the gate, the water will flow through a bottom release pipe. This design allows the sediment pool to be operated either wet (gate closed) or dry (gate open).

Both structures have a design life of 100 years. FRS No. 1 will contain 0.63 watershed inches or 110 acre-feet of accumulated sediment. FRS No. 2 will contain 0.48 watershed inches or 34 acre-feet of accumulated sediment. The sediment pool areas will be 48 and 17 acres, respectively.

The emergency spillways will be excavated vegetated earth spillways. The bottom widths at the control section will be 400 feet for FRS No. 1 and 240 feet for FRS No. 2.

The floodwater storage capacity of 539 acre-feet for FRS No. 1 is equivalent to 3.10 watershed inches. The floodwater storage capacity of 186 acre-feet for FRS No. 2 is equivalent to 2.60 watershed inches. The flood pool areas are 140 acres and 33 acres, respectively.

Approximately 73 percent of the watershed area is controlled above Water Street by the combination of FRS No. 1 and FRS No. 2. Water Street is approximately the center of the watershed area subject to damage. FRS No. 1 provides 66 percent of this control and FRS No. 2 provides the remaining 34 percent. The drainage area above FRS No. 1 is 3.26 square miles and the drainage area above FRS No. 2 is 1.34 square miles.

The construction and operation of the two structures will affect two town roads and U.S. Highway 10. FRS No. 1 will require 1,360 feet of Hacker Road to be changed below the emergency spillway. In addition, about 360 feet of Harvestore Road would be subject to flooding from the 100-year flood and will be raised. U.S. Highway 10 crosses the FRS No. 2 flood pool. Under present and future conditions U.S. Highway 10 at this location is inundated to a maximum depth of 1.5 feet during the 100-year flood. It is planned to raise the highway above the 100-year flood line.

Construction of FRS No. 1 will require moving or modifying 1,360 feet of 4-inch gas line owned by the Wisconsin Public Service Corporation. Construction of FRS No. 2 will require moving or modifying about 1,100 feet of a 4-inch and 300 feet of a 6-inch gas line owned by the Wisconsin Public Service Corporation. The line crosses the sediment and flood pools.

Land rights for the structures, spillways, pool areas, and work areas will require 157 acres for FRS No. 1 and 72 acres for FRS No. 2.

The structure located at the outlet of Long Lake will be a reinforced concrete straight drop spillway with an earthen emergency spillway. It will pass the 100-year storm with a 1-foot rise in the level of

Long Lake. The structure will have a 50-foot weir length, 1.5-foot weir depth, and 3-foot overfall. The crest elevation will be approximately 3 inches lower than present lake level. About 2,600 feet of channel work beginning 200 feet upstream is needed for proper operation of the structure. The work consists of shaping the intermittent stream to a 50-foot bottom and 3:1 sideslopes. The bottom profile will be excavated to match the crest and apron of the drop spillway. The spoil will be levelled and seeded. Seven acres are required for land rights and work areas. One farm road crossing will need to be modified. See figure 6 for location.

Measures to be taken during construction to minimize soil erosion and water, air, and noise pollution are those described in the Soil Conservation Service Engineering Memorandum 66, Guidelines for Minimizing Soil Erosion and Water and Air Pollution During Construction; Soil Conservation Service Engineering Memorandum 76, Public Safety at Structural Works of Improvement; and the U.S. Department of the Interior, Bureau of Reclamation publication, Safety and Health Regulations for Construction. Contractors will be required to adhere to strict guidelines for minimizing soil erosion and water and air pollution during construction. Construction areas will be vegetated during and immediately after construction. Measures such as diversions, debris basins, and stream crossings will be installed as needed to control pollution.



LONG LAKE OUTLET CHANNEL.
THE STRUCTURE SITE IS BEHIND THE HILL ON THE LEFT.

Based on a thorough onsite investigation by the State Historical Society, no historical or archeological sites are in or near the proposed works of improvement. However, the State Historical Society of Wisconsin and the National Park Service will be advised if evidence of archeological impact is discovered during construction.

Investigation has disclosed that under present conditions the project measures will not result in the displacement of any person, business, or farm operation.

Nonstructural Measures

The city of Brillion in cooperation with the Wisconsin Department of Natural Resources will adopt a flood plain ordinance prior to construction of the structural measures. The ordinance will be in accordance with State laws. The Calumet County Soil and Water Conservation District has petitioned the county to adopt flood plain zoning for the watershed based on data developed for this work plan.

Operation and Maintenance

Landowners and operators cooperating with the county soil and water conservation district will be responsible for the maintenance of land treatment measures installed on their land. Technical assistance will be available from the U.S. Soil Conservation Service and the Wisconsin Department of Natural Resources, Bureau of Forest Management, in cooperation with the U.S. Forest Service.

The Calumet County and Manitowoc County Soil and Water Conservation Districts will operate and maintain all structural works of improvement after they are installed. The districts have obtained commitments from the Calumet County and Manitowoc County Boards that the boards will furnish necessary funds for operation, maintenance, and replacement of all works of improvement installed under this plan in their respective counties. This commitment is in the form of a resolution passed by the county boards. The sponsoring local organization may enter into agreements with other entities to carry out the operation and maintenance activities.

The sponsoring local organization is responsible for the proper operation and maintenance, without cost to the Federal government, of works of improvement which are installed in part with Public Law 566 funds and for which there will be a continuing need for operation and maintenance. They are also responsible for obtaining all necessary permits.

-Planned Project-

The structural measures for flood prevention require no manual operation to achieve the level of flood protection outlined in this plan. The gated sediment pools may be operated wet or dry. Specific items necessary for the operation and maintenance of the structural works of improvement shall include, but are not limited to, the following:

- 1. Periodic maintenance will be required to insure proper functioning of the structural works.
- 2. All structures are to be maintained by making repairs or replacements as needed.
- 3. Obstructions, trash, and debris are to be removed from the principal spillway inlets, outlets, channel, and other structural works during and immediately after storm events.
- 4. Repairs to structures or structural features damaged by floods will be made promptly.
- 5. FRS No. 2 will be operated dry because of the gas line passing through the pool area.
- 6. A drainage gradient will be maintained through the dry sediment pool so that no stagnant pools are formed. This will eliminate potential health hazards and mosquito breeding areas.
- 7. Mowing of the structure sites, channel, and sediment pool will be restricted to prevent damage to nesting habitat; however, mowing will be often enough to maintain good grass cover. In addition, spot control of noxious weeds may be accomplished by mowing or spraying.

Estimated annual costs for operation and maintenance is \$1,530. This includes \$340 for single-purpose flood prevention structures and \$1,190 for Long Lake outlet control structure.

For a period of 3 years following installation of each structural measure, the Chairman of the Soil and Water Conservation District Supervisors, President of the Brillion Watershed Association, Chairman of the Highway Committee of the County Board, and a representative of the Soil Conservation Service will make a joint annual inspection. Annual inspections following the third year will be made by the Chairman of the Soil and Water Conservation District Supervisors, President of the Brillion Watershed Association, and the Chairman of the Highway Committee of the County Board. A report will be sent

to the designated Soil Conservation Service representative. Inspections, including a report, will also be made after floods or after the occurrence of any situation that might adversely affect the operation of any of the structural measures. Inspections will cover all portions of each structure, channel below, and the ponded area above. It will include the determination of vector breeding areas. Those areas caused by the project that might pose a public health threat or nuisance to the public will be eliminated.

The installation and operation and maintenance of the planned works of improvement must meet the requirements of the Wisconsin Department of Health and Social Services, the Manitowoc County Public Health Nursing Service, and the Calumet County Public Health Nurses Office.

Representatives of the Federal, State, and county governments shall have free access at all times to the structural works of improvement for official activities. All phases of operation and maintenance of these facilities shall comply with applicable local, State, and Federal regulations.

All operation and maintenance agreements must be executed prior to the signing of the land rights agreement or the project agreement for construction of structural measures. A separate operation and maintenance agreement will be prepared for each structural measure. These agreements will contain, in addition to specific sponsor responsibilities for nonstructural and structural measures, specific provisions of OMB Circular A-102 for retention and disposal of real and personal property acquired in whole or in part with Public Law 566 funds.

Each operation and maintenance agreement will contain a reference to the State of Wisconsin Watershed Operation and Maintenance Handbook for Projects Installed With Assistance from the Soil Conservation

Service. An operation and maintenance plan will be prepared for each structural measure.

Project Costs

The total project installation cost is estimated at \$537,970 of which \$253,730 will be paid by Public Law 566 funds and \$284,240 will be paid by other funds. The total construction cost is estimated at \$161,020, all of which will be paid by Public Law 566 funds.

ENVIRONMENTAL SETTING

Physical Resources

The Brillion watershed, located in east-central Wisconsin, has a drainage area of 13,811 acres or 21.6 square miles. About 11,520 acres are in northeastern Calumet County and 2,291 acres are in northwestern Manitowoc County. The irregularly shaped watershed is about 8 miles long and 5 miles wide.

Brillion, the only incorporated community, is centrally located in the watershed. Brillion is about 25 miles south of Green Bay and 100 miles north of Milwaukee. The western boundary of the watershed is approximately 10 miles from Lake Winnebago. The eastern boundary is approximately 20 miles from the shores of Lake Michigan.

The rural population of the watershed is estimated to be 1,450. The population of Brillion is 2,588 (1).

The watershed is within the Great Lakes Region as delineated by the Water Resources Council. The watershed is also within the Southeast Wisconsin Rivers basin where an intensive study of water and related land resources was conducted by the United States Department of Agriculture. The watershed is located within the East Central Wisconsin and Bay-Lakes Regional Planning Areas and is included in the Lake Winnebago District of the Wisconsin Uniform State Districts.

Flooding from runoff produced by snowmelt and/or rainfall occurs annually. These floods cause extensive damage to industrial, residential, and commercial properties. Brillion has a long history of damaging floods. Approximately 30 acres of urban and built-up land are subject to flooding during severe storm events.

Inadequate channel capacity and lack of adequate outlets cause interrelated floodwater and drainage damages to 850 acres of cropland, mainly northwest of Brillion. See figure 5, appendix B.



FREQUENT FLOODING OCCURS IN RURAL AREAS.

Upland sheet erosion occurs throughout the watershed. Gross erosion for the upland agricultural area averages about 3.1 tons per acre per year. Sedimentation in the channels and flood plains poses a threat to fish and wildlife habitat as well as to agricultural use. Spring Creek delivers approximately 7,200 tons of sediment annually to the Brillion Marsh.

The topography is characterized by irregular, rolling, low-lying uplands; flat, broad, poorly defined drainageways; and nearly level lake plains. Maximum relief is about 125 feet. The highest point in the watershed is about 925 feet above mean sea level. It is slightly less than 800 feet above mean sea level where Spring Creek joins the North Branch of the Manitowoc River.

-Setting-

The Kewaunee, Manawa, and Poygan soil series make up about 7.5 percent of the Brillion watershed. Adrian, Houghton, Boyer, Mundelein, and Yahara are some of the minor soil series.

The Kewaunee series consists of well and moderately well drained, gently sloping and sloping soils formed in reddish clay glacial till. The Manawa series consists of somewhat poorly drained, nearly level soils formed in the same till as the Kewaunee soils. Soils of the Poygan series are poorly drained, nearly level or slightly concave and formed in the same reddish clay till.

The Adrian series consists of very poorly drained, nearly level soils formed in 30 to 40 inches of muck underlain by medium sand. The Houghton series consists of very poorly drained, nearly level soils formed in more than 51 inches of muck. The Boyer series consists of well drained, gently sloping and sloping soils formed in loamy outwash over calcareous sand and gravel. The Mundelein series consists of somewhat poorly drained, nearly level soils formed in stratified silt and clay. The Yahara series consists of somewhat poorly drained, nearly level soils formed in loamy outwash over calcareous fine sand and silt.

No class I agricultural soils are found in this watershed. All of the soils have slight to severe limitations for agricultural use. The Kewaunee and Boyer soils have a water erosion hazard and fall into IIe, IIIe, or IVe classes and subclasses. The Manawa, Poygan, Yahara, and Mundelein soils need supplemental drainage and are in capability class II with a w subclass. The organic soils have a wind erosion hazard, need drainage, and are subject to settling when drained. They fall into class IV and subclass w land (3).

Most of the soils in this watershed are good to fair for agricultural use. Many of them, especially the clayey and wet soils, have severe limitations for building sites. The soils in the watershed are also generally well suited for woodland and wildlife.

The watershed is on the glacial drift covered backslope of the Niagara cuesta. The upper surface of a generalized geologic section is a thin mantle of Recent soils and alluvium developed from Pleistocene deposits of the Wisconsin Stage of glaciation. The glacial drift is as much as 200 feet in thickness. The main glacial deposits are ground moraine (till), lake bed deposits, and outwash. Two well-defined substages of the Wisconsin Stage are present in the watershed. The upper drift is the Valders substage (red glacial drift) and the underlying drift is the Cary substage. The deposits of the Pleistocene epoch are underlain by the Niagara dolomite of Silurian age. The Niagara dolomite is underlain by a thick sedimentary sequence of Cambro-Ordovician Paleozoic rocks. These rocks are underlain by the Precambrian igneous basement rock, a granite present about 1,200 feet beneath the surface (4).

Silurian rocks outcrop in the watershed but are mostly obscured by Recent soils, alluvium, and colluvium, and Pleistocene outwash, lacustrine clay, and ground moraine. The best profile of an outcrop is a large quarry northeast of U.S. Highway 10 in Brillion. The quarry has been operated for many years and occupies about 40 acres. At least a 50-foot section of Silurian (Niagara) dolomite has been exposed. It is overlain by soils, 6 feet of red clayey till, and 9 feet of gray till. The rock is a thick-to-thin bedded calcitic dolomite with some shale and chert zones. Fossils are scarce. There are two sets of joints at approximate right angles with more prominent east-west joints or fractures. The rock has no appreciable dip, but the regional dip of the Paleozoic strata is east-southeast. Glacial striae at the quarry have a south 55 degrees east trend.

Commercial mineral production is limited and consists of sand, gravel, and dolomite. The large quarry in Brillion furnishes some road material. Small sand and gravel pits are common but much of the pit material has a high silt content and is seldom used.

Brillion watershed has a humid continental climate with a large variation in temperature. January, the coldest month, has an average

-Setting-

temperature of 16 degrees Fahrenheit (F). July, the warmest month, has an average temperature of 70 F. Average annual precipitation is 30 inches. Approximately 70 percent of the precipitation occurs as rain during the growing season of May through October. Local storms with high intensity rainfall are common during the summer months. The first killing frost in the fall is in early October and the last killing frost is in mid-May. Winter prevailing winds are northwesterly. Summer prevailing winds are southwesterly (5).

Precipitation of 2.25 inches in a 24-hour period occurs annually. Runoff from storm events of this magnitude causes flooding in the watershed. A 24-hour rainfall of 3.70 inches will occur on an average of once every 10 years. Rainfall from storms having a frequency of once in 10 to 100 years (3.70 to 5.15 inches) causes extensive flood damages. (6).

Spring Creek, a modified, well-defined stream, rises in Calumet County in section 11, T. 20N, R. 20E. The stream is intermittent in its headwaters. It flows in a generally southwesterly direction 9 miles into the North Branch Manitowoc River in section 4, T.19 N., R. 20E. An intermittent stream drains Round Lake, Long Lake, Becker Lake, and Grass Lake and joins Spring Creek in Brillion Marsh below Brillion. The North Branch Manitowoc River joins the Manitowoc River and discharges into Lake Michigan. The drainage pattern in the watershed is random.

Streambank erosion is minor because of the relatively flat stream gradients. Vegetation varies from sparse in recently altered reaches in the vicinity of the Brillion Iron Works to dense south of Water Street in Brillion. Grassland with scattered trees predominate on most streambanks throughout the watershed. Most streambanks are not pastured. The streambeds are mainly finegrained materials, mostly silt.

Water quality in the streams varies by location and season. Water quality data has been collected by JFK Prep School (12), Brillion High School (18) (19), and the Soil Conservation Service (17). Test data from six grab samples taken by the University of Wisconsin-Stevens Point for the Soil Conservation Service on March 11, 1974, follow:



SPRING CREEK BELOW BRILLION IRON WORKS



DRAINAGEWAY AND MARSH JUST ABOVE BECKER LAKE

-Setting-

		Site <u>1</u> /					
Item	Unit	1	2	3	4	5	6
						4	0
Temperature	°C	2	2	3	3	1	2
Turbidity	JTU	3	3	3	3	2.5	2.5
рН	-	7.9	7.8	7.8	7.8	7.5	7.6
Conductivity	uMHOS	520	570	580	750	380	275
Alkalinity	mg/l	200	222	218	221	126	116
Total hardness	mg/l	312	316	268	324	160	140
B.O.D.	mg/l	1.8	2.2	2.0	2.5	3.1	2.85
Dissolved Oxygen	mg/l	8.7	11.6	11.1	11.1	1.7	7.0
C.O.D.	mg/l	47.6	37.7	37.7	31.7	77.4	55.6
Chloride	mg/l	16	20	25	85	29	10
Ortho P	mg/l	0.060	0.070	0.107	0.094	0.132	0.080
Total P	mg/l	0.105	0.255	0.185	0.160	0.240	0.175
	mg/l	0.14	0.07	0.14	0.07	0.28	0.18
NH ₃	mg/l	1.19	2.63	2.49	2.59	0.81	0.56
NO ₃ - NO ₂	mg/l	1.92	1.54	2.06	1.82	2.38	2.38
Kjeldahl N	mg/l	0	25	0	35	0	49
Suspended solids	_	390	360	340	460	226	156
Total solids	mg/l		335	364	425	264	107
Dissolved solids	mg/1	412		5845	2280	0	0
Fecal Coliforms	No/100 m	1 0	65	2040	2200	U	•

Site locations are shown on the project map. Sites 1-4 are on Spring Creek at Rusch Road, County Trunk Highway PP, Water Street, and Sunset Drive, respectively. Sites 5 and 6 are at the inlet and outlet of Long Lake.

The Spring Creek samples (1-4) are all high in hardness, alkalinity, pH, and nutrients and fairly low in solids and biochemical oxygen demand. The Brillion High School and JFK Prep School found that hardness varied from 110 to over 750 parts per million and pH varied from 7.0 to 9.7. The source of nutrients in Spring Creek is unknown. It is unlikely to be from surface runoff at sites 1 and 2 since the fecal coliform counts are very low. The high fecal coliform counts at sites 3 and 4 indicate a large input somewhere between sites 2 and 3. This corresponds to an increase in Kjeldahl-N and ortho P with no increase in biochemical oxygen demand or other nutrient values. This section of stream would be considered unsafe for water sports where the body is in contact with the water.

The Brillion sewage treatment plant discharges into Spring Creek a block above Sunset Drive. The effluent has a definite effect on water temperatures. In the winter it rises and in the summer it is cooler. Hardness, chlorides, pH, and nutrients increase below the outfall (18) (19). Analyses of the samples at sites 5 and 6 above and below Long Lake show the water to be much lower in hardness and alkalinity than Spring Creek. They are low in oxygen and high in biochemical and chemical oxygen demand for the time of year. Nutrient values are quite high. Fecal coliforms were zero at both sites indicating little animal waste contamination at the time of sampling. Since site 5 had no suspended solids it points to little surface runoff.

Water supplies for most domestic and industrial needs are obtained from shallow to deep wells in river alluvium, glacial outwash, glacial drift, or in Paleozoic sandstones and limestones. Almost all ground water is hard, having over 400 parts per million of dissolved solids (7). Some commercial and residential water supplies are presently being softened.

The main agricultural use of ground water is for livestock watering. Two irrigation systems are presently operating within the watershed. One is a 10-acre system for strawberries. The other is a canning company waste water disposal system. Ground water supplies are adequate for future needs.

The existing municipal water supply, primarily from wells, is good. The population of Brillion is expected to increase by 30 percent by the year 2000. There is an adequate water supply for future demands.

Land use in the total watershed and the flood plain are shown in the following table:

	Total Watershed		Flood Plain	
Land Use	Acres	Percent	Acres	Percent
Cropland	9,600	70	850	55
Grassland	1,700 1/	12	290	19
Forest Land	$850 \frac{2}{2}$	6	110	7
Urban and Built-up	670 3/	5	130	9
Other	991 $\frac{\overline{4}}{4}$	7	160	10
TOTAL	13,811	100	1,540	100

- 1/ Includes 230 acres type 2 and 200 acres type 6 wetlands.
- 2/ Includes 300 acres type 7 wetlands.
- 3/ Includes 30 acres type 2 wetlands.
- 4/ Includes 290 acres types 3, 4, and 5 wetlands; 191 acres lakes; and 510 acres roads, farmsteads, etc.

Approximately 850 acres of the watershed are forested. About 400 acres of forest lands are along drainageways and flood plains and 450 acres are on the uplands. The hydrologic conditions of these forest lands is good. Hydrologic condition is defined as the relative ability of specific combinations of soil and vegetative cover to absorb precipitation and retard runoff. It expresses the interrelationship existing between the soil and forest cover, and their effect on the movement of precipitation on, into, and through the soil.

Wetlands are defined in Wetlands of the United States, Department of the Interior, Fish and Wildlife Service Circular 39 (8). An estimated 1,050 acres of wetlands are found in the watershed. These include 260 acres of type 2, 240 acres of type 3, 50 acres of types 4 and 5, 200 acres of type 6, and 300 acres of type 7. Type 1 wetlands were not inventoried.

The southeastern portion of the watershed has 5 lakes of glacial origin: Round Lake - 11 acres; Grass Lake - 20 acres; Boot Lake - 11 acres; Becker Lake - 32 acres; and Long Lake - 117 acres (9). Southwest of Brillion is a roughly triangular area of wetland that extends to the margin of the watershed and drains into the North Branch Manitowoc River.

Present and Projected Population

The estimated 1970 population for the city and town of Brillion is 3,912. The 1990 projected population is 6,817, an increase of 74 percent. These projections are based on predictive equations incorporating the influence of community size, location, proximity to growing urban areas, and past growth trends from 1940 to 1970 (14).

Economic Resources

Landownership in the Brillion watershed is generally private. Public land is limited to buildings, roads, and parks. The State of Wisconsin proposes to purchase and develop for waterfowl about 2,000 acres in the Brillion Marsh area including the lower reaches of Spring Creek. Land purchase is now underway. There are no Federal lands in the watershed.

The majority of the farm units are classed as family type farms. These farms use less than 1.5 man-years of hired labor. The average farm size is 90 acres. There are 139 farms in the watershed, 104 in Calumet County and 35 in Manitowoc County. Ninety-three percent of the landowners are cooperators with their local soil and water conservation district.

Agriculture is important in the Brillion watershed with the sale of livestock, poultry, and their products accounting for 91 percent of the cash farm income. Dairy products are the largest source of farm income. According to the 1969 U.S. Census of Agriculture, farms in Calumet County had average sales of \$15,000, identical to the State average. The county average is typical of the watershed.

Principal crops grown are corn, oats, and hay. Sweet corn, peas, and beets are also grown. Average bottomland flood-free yields per acre are: corn - 90 bushels; oats - 80 bushels; and hay - 3.5 tons. Upland yields are: corn - 85 bushels; oats - 72 bushels; and hay - 2.5 tons. Almost all of the feed and grain crops grown are utilized on farms within the watershed. A common rotation in the flood plain is 2 years corn, 1 year oats, and 2 years hay. Upland rotations average 2 years corn, 1 year oats, and 3 years hay.

The number of farms in Calumet County declined between 1959 and 1969. At the same time, the average size of farms increased, as did the value of land. The value of agricultural land varies significantly. Average values are estimated at \$350 per acre in the flood plain and \$400 per acre in upland areas. Wildlife or wetland area values are estimated at \$100 per acre. Land for new urban development has a value of \$700 per acre.

Brillion watershed has an extensive network of roads. U.S. Highway 10 crosses the watershed in an east-west direction, passing through Brillion. State Highway 114 enters the watershed at its southern border and runs north to end at Brillion. County Trunk Highway PP bisects the northern half of the watershed in a north-south direction from Brillion. Additional town and county roads serve as good all year transportation routes. The Chicago and Northwestern Railroad is immediately south of and roughly parallel to U.S. Highway 10. This transportation network provides for the convenient and efficient movement of agricultural and manufactured items produced in the watershed.

Brillion watershed is in a strategic position between two expanding industrial areas, the Fox Valley corridor and the cities along Lake Michigan. About 380,000 people live within a 25-mile radius of Brillion (1). Calumet County is included in the Appleton-Oshkosh Standard Metropolitan Statistical Area.

Industry offers many opportunities for off-farm employment. Two important employers are the Brillion Iron Works, and the Ariens Company. Brillion Iron Works manufactures farm equipment and several nonagricultural items. The Ariens Company manufactures lawn and garden equipment. There are numerous smaller, but important, employers such as Larson Canning Company, Zander Press, Rent-a-Truck, and various retail outlets.

Agriculture remains a substantial industry in the area, employing about 15 percent of the labor force as compared with 6.5 percent of the labor force in the State of Wisconsin. Manufacturing has taken the lead as the largest employer, utilizing about 42 percent of the labor force as compared with 31 percent of the labor force in the State of Wisconsin (10). Calumet County has 159 manufacturing jobs per thousand residents compared with the State average of 118. This is typical of the watershed.

Median family income in Calumet County in 1969 was \$10,130 as compared to the State median of \$10,070, which is typical of the watershed. (10) The county's retail sales are smaller than the State average. Per capita sales of \$1,270 compare with the State average of \$1,580. The strongest retail lines are in lumber, hardware, and farm equipment. The watershed is not within an economically depressed area.

Approximately 32 family farms sustain floodwater damages. Many family farms have agricultural water management problems. Fifty-six properties within the urban area have floodwater damages with present conditions.

A majority of the forest land is in private ownerships. The average forest ownership is about 20 acres. Some forest land occurs on the portion of the State-owned Brillion Marsh Wildlife Management Area that is in the watershed.

Markets for saw logs and veneer are very good, but the values of forest for wildlife and watershed protection currently take precedence.

Fire protection is provided through the Department of Natural Resources coordination of the respective town fire departments. All forest areas are adequately protected.

Contributions of forest resources to the local economy are primarily recreational. They provide wildlife habitat, variety to the landscape, and shelter for homes, parks, and picnic areas.

Plant and Animal Resources

About 450 upland acres support stands of the oak-hickory and beech-birch-maple types. The 400 acres in the more poorly drained sites support beech-birch-maple and elm-ash-cottonwood types that are useful as wildlife habitat. Upland areas are largely used for recreation, wildlife, watershed protection, and esthetics.

Wetlands, which furnish important wildlife habitat, occupy about eight percent of the area. Most of the wetlands are within the Brillion Marsh portion of the watershed. Overall, the amount of wetlands remains relatively constant. However, by definition the types of wetland are changing.

A land use change from cropland to idle land, notably in the Brillion Marsh is increasing the amount of habitat available for wildlife. The water surfaces of Brillion Marsh and Long Lake are higher today than 30 years ago because of sediments, especially decaying vegetation. The marsh and associated grasslands along with the five glacier lakes provide excellent waterfowl habitat.

The five lakes, with a combined surface area of 191 acres, provide valuable fisheries. Northern pike, largemouth bass, panfish, crappie, and carp are common species. Most of the lakes are highly fertile and support an abundance of carp. Grass Lake and Boot Lake are shallow with depths of 3 and 16 feet respectively. Becker and Round Lakes, at 51 feet, are the deepest. Long Lake is 37 feet deep.

The present stream fishery is negligible. Severe annual winterkills are experienced in the lower reach of Spring Creek. Most of the streams are managed for forage and rough fish. Northern pike and crappie are found within limited reaches of the stream. The estimated 6 miles of perennial streams have a surface area of 13 acres.

A variety of wildlife inhabits the Brillion watershed. The most common game species are deer, rabbits, squirrels, raccoons, opossums, foxes, waterfowl, woodcock, pheasants, and Hungarian partridge. Migrating birds using the Lake Michigan shoreline are common visitors to the watershed in the spring and fall. The Arctic peregrine falcon and the southern bald eagle are threatened species that may occasionally visit the watershed (13).

-Setting-

Recreational Resources

Opportunities for water-based recreation in and near Brillion are adequate for present and future needs. Lake Michigan and Lake Winnebago are within 20 miles of Brillion. Brillion maintains a highly developed city park and an 18-hole golf course. The Wisconsin Department of Natural Resources will provide a major recreational resource when it completes a proposed 5,779-acre public development as part of the Brillion Marsh Game Management Area. It will provide opportunities for boating, fishing, hunting, hiking, and nature studies.

The five glacial lakes with a combined area of 191 acres provide limited opportunities for recreation. Fishing pressure is moderate. Long Lake is the most highly developed lake. The Manitowoc County Park Board maintains a park and public boat landing on the northeast side of the lake. The area surrounding Long Lake has been divided into residential plots. Land disturbance associated with the installation of trailers and cabins has increased erosion and silt deposition in the lake. Septic tank effluent has polluted the lake water. Lake treatment during the last 5 years has been necessary to reduce algae. Long Lake's fishery and water quality have deteriorated because of heavy rough fish populations.

Archeological and Historical Resources

The Director of the State Historical Society (State Historic Preservation Officer) and local residents were consulted to determine any areas with archeological, historical, scientific, or scenic values in the watershed. A field survey of possible archeological sites was conducted by the State Historical Society. Local residents identified the lime kiln ruins in Brillion as being a potential historical site. No areas are listed in the National Register of Historic Places (15) or by the Wisconsin Scientific Areas Preservation Council (16).

Soil, Water, and Plant Management Status

The U.S. Census of Agriculture shows a downward trend in the amount of farm land and an increase in the average farm size.

The average cropland per farm is increasing, indicating a trend toward consolidation of smaller farm units. Urban and built-up areas and other land uses are increasing.

A substantial decrease in crop yields and higher production costs have resulted from delays in planting, interrupted tilling and harvesting operations, and stunted crop growth because of flooding and inadequate drainage. Poor drainage has impeded proper land use and treatment on approximately 850 acres of cropland. Many small wet areas require drainage in order to convert poorly drained cropland to more productive fields. These areas are small surface depressions, flat poorly defined drainage ways, seepage areas, and patches of poorly drained soils. Drainage is done on some of these areas by surface and subsurface drains. In many cases, tiled sod waterways are used.

The Calumet and Manitowoc County Soil and Water Conservation Districts have been active in conservation and resource planning. They work with individuals, groups, and governmental units in the proper planning and application of soil and water conservation practices. Both districts have been active in the establishment and development of the Brillion watershed.

The two districts in cooperation with the watershed farmers have an active land treatment program. One hundred and thirty of the 139 farmers are cooperators with their local soil and water conservation districts. They own and operate 11,650 acres, or 84 percent of the watershed. Thirty-eight cooperators have conservation plans on 4,182 acres, or 30 percent of the watershed. The percent of planned land treatment measures installed on their farms to date are: contour farming-30 percent; grassed waterways or outlets-35 percent; and drains-35 percent. Conservation cropping systems are being followed on 30 percent of the cropland in the watershed.

Forest stands are adequately treated. Woodland grazing has almost ceased.

During the past 10 years, five forest land plans have been prepared. These plans were concerned with harvesting, tree planting, and timber stand improvement.

Projects of Other Agencies

The Wisconsin Department of Natural Resources (DNR) is currently reviewing a proposal to develop and manage the Brillion Wildlife Area in Calumet County for the purposes of waterfowl production and outdoor recreation. Development of the wildlife area would include: acquisition of approximately 1,590 acres in Brillion and Rantoul Townships; creation of a 2,900-acre flowage on the north branch of the Manitowoc River involving a dike and water control structure; creation of a 125-acre flowage on Spring Creek involving a dike and water control structure; dredging of approximately 6,000 feet of the original bed of Spring Creek from the city of Brillion to a point within the marsh where Spring Creek is open water; construction of a dike parallel to the dredged Spring Creek channel for the entire distance of 6,000 feet that will permit separate manipulation of the water level in the two units; creation of 3 subimpoundments of the main flowage involving dikes and water control structures; construction of potholes from 1/2 to 2 acres in size; conversion of 400 acres of sharecropped land to grassland; construction of 4 parking lots and 2 scenic overlooks; establishment of a wildlife refuge or closed area of approximately 2,600 acres; and construction of a nature study center and interpretive facilities. Management for waterfowl production would be to increase watervegetation interspersion and to promote maximum growth of emergent food plants beneficial to waterfowl by water level manipulation within the impoundments. An environmental impact statement by the DNR is currently being prepared.

Calumet County has developed a proposed land use plan. A series of public information meetings will be held throughout the county prior to adoption of the plan.

No other Federal, State, or county works of improvement are known to be planned for the watershed.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land and Water Management

Important problems include sheet erosion, surface runoff, and improper land management. Land treatment needs include the orderly removal of surface runoff, the control of erosion and sedimentation, the preservation of soil fertility, and the management of water to maintain a desirable soil-water relationship.

The flooding and impaired drainage have resulted in the inefficient use of land, labor, and capital in the uplands and in the potentially benefited area.

Poor drainage and flooding of the productive soils in the flood plain have pushed intensive cultivation up the slopes causing increased sheet erosion.

Zoning and land use planning activities have not been coordinated. The amount of land treatment measures applied has been limited because of the relative inability of the small landowners and operators to finance installation. Generally, land treatment measures applied to the land have been highly dependent on cost-share funds available.

Forest land needs pertain mostly to diversion of productivity into food and shelter for wildlife. Forest land use is presently near optimum. Management plans are needed on 800 acres of forest land to assist owners in obtaining maximum recreational use and watershed protection from these lands. An additional 50 acres of reforestation is needed. Unless greater financing and agency services are provided no significant increase in forest land treatment is probable.

Floodwater Damage

Floodwater damage is the primary problem in the Brillion watershed. See figure 4, appendix B. Historical records for Spring Creek at Brillion show frequent flooding. Roads have been barricaded and traffic rerouted many times because of floods. In some years flood plains have been inundated several times. Floods have destroyed crops and pasture, washed out fences, damaged roads and bridges, damaged equipment, inundated urban areas, flooded factories, damaged public utilities, and deposited debris on cropland and pasture. Fish and wildlife habitat has been damaged by floodwaters.

The area subject to inundation is approximately 1,540 acres. Thirty-two farms are subject to flooding. Approximately 38 residences and 18 businesses in Brillion sustain floodwater damages. See figure 5. appendix B. Two homes, 17 trailers, and 32 summer cottages on Long Lake are subject to flooding. The value of urban property subject to flood damage is estimated to be \$5,564,000.

Flood plain land has changed from cropland to pasture because of frequent flooding. It is estimated that small frequent floods up to 10-year frequency account for 59 percent of the total average annual damages.

Most urban damage occurs along the main channel of Spring Creek. The western portion of Brillion also experiences flooding from the unnamed tributary in that area. In some years flood plain land has been inundated several times. The Brillion Iron Works, which spans a portion of the channel in Brillion, is flooded frequently. The unnamed tributary at the western edge of the city causes occasional flooding on the grounds of the Ariens Company.

Severe flood events were experienced in 1924, 1942, 1966, and 1969. A flood of the magnitude of the 1924 event is expected to occur on the average of once every 25 years.



FLOOD OF 1969

The key flood studied occurred in 1969. A flood of this size can be expected to occur on the average of once every 5 years. Over 250 acres including about 65 acres of cropland and pasture were inundated along Spring Creek. Flooding caused damage to 17 homes and 4 commercial establishments in Brillion. In addition, public utilities, park grounds, streets, roads, and bridges were damaged. Damage to existing agricultural and nonagricultural properties for a future storm of this magnitude would be approximately \$52,000.

Estimated average annual damages by categories are as follows: Estimated average annual damages by categories are as follows: urban - \$41,140; crop and pasture - \$1,260; roads and bridges - \$1,720; and sediment - \$550.

While the potential loss of life is high, there are no records of lives being lost because of floodwaters. Flooding causes physical and mental suffering to those directly involved. Septic tanks and outhouses around Long Lake are subject to flooding, causing a threat to public health.



SPRING CREEK FLOOD OF JUNE 1969
DAMAGED BRILLION IRON WORKS

Forest problems are encountered mainly in stands of the lowland types. Elm is dying from a variety of diseases, including Dutch elm disease. Maple and ash are encountering survival problems on the wetter sites. A 10-acre stand of elm-ash-maple type adjacent to Long Lake is showing increased mortality. This is because of a rise in the lake level over the past few years.

Erosion Damage

The watershed topography consists of gentle slopes and rolling lakebed plains. Sheet erosion from cropland is the predominant type of erosion. Gully, streambank, and roadside erosion also occur. Construction areas, though small in size, often are severely eroded. Erosion may be as much as 100 tons per acre per year on these areas. A few small gullies occur in the uplands. Occasional raw banks with an average height of about 4 feet occur along the main channels. Roadside erosion is not considered a severe problem. It occurs mostly on town roads.

Upland sheet erosion in the watershed is by far the most serious form of erosion in terms of tons of soil loss. Some cropland is currently contributing up to 13 tons per acre per year. The watershed average for cropland is about 3.1 tons per acre per year. This amounts to 2.4 inches of soil loss in 100 years. The erosion rate was higher in the past. Gross erosion of agricultural land has been reduced to the present rate by the installation of soil and water conservation practices.

Bank slumps and slides occur along drainageways and manmade outlet channels. These slumps and slides plug drainageways and increase the need for maintenance and cleanout. Bank slumps and slides, along with sediment deposition in drainageways and manmade outlet channels, are a major problem.

Large areas of the watershed are low-to-flat lying glacial lakebeds. These are sediment deposition areas rather than erosion areas. A minor amount of wind erosion does occur in the watershed. No separate monetary value was determined for sheet, streambank, gully, roadside, or other types of erosion.

Sediment Damage

Sediment laden floodwater is the principal source of sediment damages. The major soils of the watershed are silts and clays that are carried in suspension by floodwaters. Sheet erosion from cropland is the principal contributor of sediment. Gully, streambank, and roadside erosion are other sources. Excess runoff transports these sediments from the uplands to downstream areas of deposition. Generally, the area of sediment damage is the same area damaged by floodwaters.

In agricultural areas sediment is deposited on crops and pasture, retarding plant growth. Fine sediments deposited on cropland decrease water infiltration causing ponding that results in drowned crops. Pasture plants covered with a fine film of sediment are not palatable. This condition exists until the sediment is washed off by rainfall. Sediments deposited in low gradient ditches and watercourses decrease water flow and require more frequent ditch cleanout.

In urban areas sediment is deposited inside homes and commercial and public buildings. This sediment causes damage to the buildings and contents. Removal of sediment from appliances, building

-Problems-

surfaces, and furnishings is time consuming and expensive. This is also true of sediment deposited on lawns, gardens, and driveways. Sediment deposited on parks, roads, and other public properties must be removed, increasing taxes.

Sediment-laden floodwaters damage automobiles and farm machinery. Normal farm operations are disrupted by the dismantling and repair of machinery damaged by sediment. Debris carried by floodwaters is deposited or snagged by objects such as culverts, bridges, buildings, shrubs, and trees. The snagged debris often causes additional secondary damage such as washouts of plugged bridges and culverts.

The major sediment deposition areas are the Brillion Marsh and the drainageways adjacent to the marsh. Swamping caused by sediment deposited in these areas retards drainage and modifies wildlife wetland habitat. Long Lake has a sediment problem from continued construction in its watershed.

The predicted annual delivery of sediment to the Spring Creek bridge below Brillion is 7,200 tons for present conditions. Thus, sediment by volume is the greatest pollutant in Spring Creek.

Average annual downstream sediment damage is estimated to be \$550.

Drainage Problems

Lack of drainage has presented a major obstacle to agricultural production on approximately 850 acres of cropland, notably in section 22, T.20N., R.20E. Nearly 1,330 acres of grassland are also affected by seasonably high water tables. Wet or ponded conditions affect normal farming operations for extended periods of time. Wet conditions cause increased production costs. Increased costs result from additional time and materials required to perform farm operations and from the duplication of various phases of the production process.

Wet conditions also cause depressed crop yields. Flood-free crop yields on similar soils with and without adequate drainage are:

	Projected Yields	Present Yields
Crop	With Drainage	Without Drainage
Corn (bu/ac)	130	75
Oats (bu/ac)	109	79
Hay (tons/ac)	4.6	2.6

About 400 acres of forest land are located in wet areas. Timber species on these sites are not desired by sawlog and veneer markets.

Local efforts to alleviate the wet soil problem have been attempted by individual farmers. Drainage field ditches were the predominant means of treatment. These measures did not completely solve the drainage problems. Further local efforts to improve the situation have been suppressed for lack of an adequate drainage outlet.

Drainage measures needed include land smoothing, surface drains, tile drains, water control gates, and pumping plants. Installation of these measures may occasionally require group action. Land treatment measures to reduce runoff and sediment are needed in conjunction with the drainage improvements.

Soils in the problem area are deep, somewhat poorly drained, nearly level loamy soils. The soils are 20-40 inches thick overlying calcareous silt and fine sand on lacustrine plains. These are moderately permeable soils with high available water capacity. Surface drainage is feasible if proper precautions are taken to stabilize the banks. Subsurface drainage ranges from feasible to not recommended due to instability of soil material.

It is estimated that the drainage problem depresses annual net farm income in the watershed an average of \$5,320.

Plant and Animal Resource Problems

Heavy populations of rough fish are helping to degrade the Long Lake fishery and its water quality. They have been attracted to the lake because of its high fertility. Turbidity is increased by these fish.

No known rare or endangered animal species reside in the Brillion watershed (11). The Arctic peregrine falcon and southern bald eagle may be infrequent migrants.

Water Quality Problems

Septic tank effluent poses a water quality problem for Long Lake during flood flows. The lake has been treated to reduce algae during the past 5 years.

The high fecal coliform counts in Brillion found during the water quality survey could pose a health hazard. Water contact sports may not be safe during times of such high counts. The source of the fecal coliforms is nonagricultural.

RELATIONSHIP TO LAND USE PLANS, POLICIES AND CONTROLS

Hydrologic and hydraulic data generated by the project have been used to obtain Federal flood insurance for Brillion. Installation of the project will reduce future flooding and may result in reduced flood insurance rates.

A flood plain zoning ordinance is also being developed by the city of Brillion and the Department of Natural Resources based on the hydrologic and hydraulic data generated by the project. The ordinance will conform to applicable State laws.

ENVIRONMENTAL IMPACTS

Conservation Land Treatment

Land treatment measures on the uplands will reduce average cropland sheet and gully erosion from 3.1 to 2.8 tons per acre per year. Water retention capability of upland areas will be increased, resulting in an overall reduction in surface runoff volume. Land treatment measures to be installed by individual farmowners and operators will have the following effects:

- 1. All types of erosion will be reduced. It is estimated that land treatment measures to be installed during the 4-year installation period will reduce cropland sheet and gully erosion by 0.3 tons per acre per year. This is a decrease of ten percent. A similar decrease will occur for other agricultural land uses.
- 2. Damage from sedimentation will be reduced. Reduction in erosion will be accompanied by a corresponding reduction in sedimentation. This sediment reduction will be supplemented by the trap efficiency of the two floodwater retarding structures. It is estimated that sediment reaching the Brillion Marsh from the watershed will be reduced by 37.5 percent of the present estimated delivery rate of 7,200 tons per year.
- 3. Soil moisture and ground water recharge will be increased through improved hydrologic characteristics. Water retention (precipitation minus runoff) will be increased.
- 4. Productive land, a prime national resource, can be used more wisely and within its capability.
- 5. Installation of forest land treatment measures and intensified multiple-use management will enhance recreational and wild-life values and contribute substantially to beautification, esthetic appeal, environmental quality, and future use of the woodland resources.
- 6. Costs of maintaining structural works of improvement will be reduced by the installation of land treatment measures above structure sites.

-Impacts-

- 7. Wildlife habitat will be protected and enhanced.
- 8. Runoff will be reduced by about one percent in downstream areas.
- 9. About 150 acres of wet cropland will be drained. Average yields on this land will increase by the following percentages: corn, 73; oats, 38; and hay, 77.

Proposed land treatment measures to be installed during the project period will affect approximately 3,900 acres of cropland or grassland and 726 acres of forest land. The total acreage affected, 4,626, is about 33 percent of the 13,811 acres in the Brillion watershed.

Structural Measures

Structural works of improvement to supplement the land treatment measures will protect 660 of the 1,540 flood plain acres in the watershed. Structural measures will reduce floodwater and sediment damage by amounts ranging from a minimum of 47 percent to a maximum of 100 percent in the affected area.

The two floodwater retarding structures will control 21 percent of the watershed and about 73 percent of the total drainage above Water Street in Brillion. The depth of flooding and the area flooded will be reduced on approximately 120 acres of agricultural land and 103 acres of urban land. Reductions in area flooded around Long Lake and below the floodwater retarding structures for 24-hour duration storms are shown in the following table.

Area Flooded In Acres

Storm	Without Project	With Project
2-year	360	230
5-year	480	310
10-year	540	350
100-year	660	470

The total area where flooding by the 100-year frequency storm is eliminated by structural measures is estimated to be 190 acres. Flooding is reduced on an additional 470 acres.

Typical reductions in peak flows for 24-hour duration storms of 100-year and 5-year frequencies for selected locations within the watershed are:

PEAK DISCHARGES IN CUBIC FEET PER SECOND

	100-3	year	5-year		
Location	Without	With	Without	With	
U.S. Highway 10	1,790	75	750	55	
Water Street	2,310	1,190	970	500	
Sunset Drive	2,320	1,350	960	600	

Within Brillion the following minimum levels of protection will be obtained: (1) 100-year frequency flood or better protection at U.S. Highway 10; (2) 100-year frequency flood protection or better at Water Street; (3) 2-year frequency flood protection at Sunset Drive. The above levels of protection are minimums. Urban property in Brillion, except for some yards, gardens, streets, and the park, will have 100-year protection. Some houses are in the 100-year flood plain; however, no first floor damage will occur. The cabins and trailers along Long Lake will have 100-year protection.

-Impacts-

Typical reduction in stage from floods of 100-year frequency would be 6 feet in the agricultural area above Brillion. The reduction in stage would be about 1 foot in the residential and agricultural areas of the downstream portion of the watershed. The level of Long Lake will have a stage reduction of 3 feet.

Structural flood prevention measures will protect 38 homes, 18 commercial buildings, 3 agricultural landowners, and 10 bridges. Fifty-one properties with either temporary or permanent residences will receive protection from the Long Lake structure. About 103 acres are subject to flooding in Brillion from a 100-year flood event. The effects of structural measures would be to reduce the area flooded to about 80 acres. The degree of protection is illustrated on figures 4 and 5. The future 100-year flood (with project) will be equivalent to the present 10-year flood.

The flood stage resulting from a storm of the size of the 1969 flood would be reduced 2 feet at Water Street. The flood stage at the Brillion Iron Works plant would be reduced 3 feet and the flood stage in the upland agricultural area would be reduced about 4 feet.

Remaining flood hazard will exist on the flood plain for large, infrequent storms. See the dark blue area in figure 4. In lower agricultural areas and in the Brillion Marsh area infrequent flooding will continue but the extent and depth of floods will be reduced.

Present land use in the flood plain of Spring Creek is expected to continue. Major agricultural lands in the Spring Creek flood plain (about 40 acres) will be provided with a more stable productivity. Increased agricultural production on new lands is not a primary purpose of this project. Benefits derived from increased production from surplus crops on new lands are not necessary for economic justification.

Installation of FRS No. 2 will affect any future relocation of U.S. Highway 10. No rerouting is currently being considered.

Project installation will reduce floodwater damages in the protected area by 51 percent in agricultural areas and by 99 percent in non-agricultural areas (\$49,250 to \$1,400).

About 1.5 miles of intermittent streams will be inundated by the sediment pool at FRS No. 1 and 0.5 miles of intermittent stream will be in the dry sediment pool of FRS No. 2. An additional 250 feet of stream will be replaced by pipe flow through the dams. FRS No. 1 will release warmer water affecting 1 mile of Spring Creek between

-Impacts-

the dam and Brillion Iron Works. This water is estimated to be about 2 degrees Centigrade higher. This discharge should be intermittent, since the present stream is intermittent at the structure site.

The Long Lake structure and its approach and exit channels will disrupt about 0.5 miles of intermittent stream and its associated types 2 and 3 wetlands.

The dams and spillways at FRS No. 1 and FRS No. 2 will destroy an estimated 2 and 6 acres of wetlands, respectively. Approximately 35 acres of wetlands will be inundated by the wet sediment pool at FRS No. 1. The dry sediment pool at FRS No. 2 contains 10 acres of wetlands. After the project there will be 48 acres of wetlands at FRS No. 1 and 17 acres of wetlands at FRS No. 2 for an overall gain of 12 acres of wetlands. Most of the above wetlands are types 2, 3, 4, and 5 (8).

The project will create a 48-acre sediment pool with a shoreline of 1.9 miles at FRS No. 1. This pool has a design life of 100 years. It will fill with accumulated sediment and eventually become a marsh. Meanwhile, it will be used by waterfowl as a satellite pool to the larger development planned by the Wisconsin Department of Natural Resources. It will provide hunting opportunities. Public access is available at Harvestore Road and Hacker Road. FRS No. 2 will provide negligible or no recreational opportunities.

The new structure at Long Lake will lower the water elevation about 0.3 feet. This will result in a slightly smaller lake area. The lake level will be stabilized, resulting in less fluctuating of the lake throughout the year. The benthic community will not be subjected to fluctuating water levels.

Land treatment and structural measures will reduce sediment in the streams by about 2,600 tons per year, resulting in improved fish habitat.

The two floodwater retarding structures and the Long Lake structure will affect 122 acres of cropland, 80 acres of grassland, 8 acres of forest land, and 11 acres of other land. After completion of the project there will be 48 acres of water, 44 acres of cropland, 125 acres of grassland, no forest land, and 4 acres of other land. The acres of each land use for each structure for present conditions and with project are:

		Dam and Spillway			Sediment Pool		Flood Pool				
Str.	Land Use			Po					Total		
		1/	<u>2</u> /	1/	2/		<u>1</u> /	<u>2</u> /	1/	$\frac{2}{}$	
1	Cropland	10	0	20	Ó		72	. 42	102	42	
	Grassland	1	12	16	0		20	50	37	62	
	Forest Land	0	0	8	0		0	0	8	0	
	Other Land	1	0	4	48	3/	2	2	7	50	3/
	Total	12	12	48	48		94	94	154	154	
2	Cropland	3	0	0	0		15	0	18	0	
	Grassland	3	6	15	17		20	35	38	58	
	Forest Land	0	0	0	0		0	0	0	0	
	Other Land	0	0	2	0		2	2	, 4	2	
	Total	6	6	17	17		37	37	60	60	
Long	Cropland	2	2	0	0	•	0	0	2	2	
Lake	Grassland	5	5	0	0		0	0	5	5	
Lake	Forest Land	0	0	0	0		0	0	0	. 0	
	Other Land	0	0	0	0		0	0	0	0	
	Total	7	7	0	0		0 .	0	7	7	
Total	Cropland	15	2	20	0		87	42	122	44	
	Grassland	9	23	31	17		40	85	80	125	
	Forest Land	0	0	8	0		0	0	8	0	
	Other Land	1	0	6	48	3/	4	4	11	52	3/
	Total	25	25	65	65		131	131	221	221	

^{1/} Present conditions

^{2/} With project

^{3/} Includes 48 acres of wet sediment pool.

The project will have a minimal affect on the availability of water and land resources to the potential users. Some intermittent streams and some wetlands will be lost. However, the 48-acre wet sediment pool will be available to the public.

No known rare or endangered species will be affected by the project.

Based on surveys conducted by qualified archeologists under the direction of the State Historic Preservation Officer, the Soil Conservation Service has determined that there will be no archeological sites effected by the project. It was also determined that the project would have no effect on historical or architectural properties either listed or eligible for listing in the National Register of Historic Places. (15) The lime kiln ruins in Brillion will not be affected.

Areas determined to be of scientific or natural area significance will not be affected by flood control structures or other construction as outlined in the work plan.

Economic and Social

The quality of living in the flood prone areas of Brillion and Long Lake will improve with increased flood protection. Homeowners will make more improvements on their properties. Reduced flooding will result in less water-borne debris to be removed. The flood plain will be more usable for recreational activities, such as hiking, playing, or picnicking, because of less flooding and sediment and debris deposition. Traffic interruptions due to flooded streets will be minimized. The threat of death by drowning in floodwater in Spring Creek will be reduced. Overall, residents will feel more secure in their day-to-day activities.

The 221 acres required for the structural measures will be maintained as open spaces. The 48-acre sediment pool at FRS No. 1 will have public access.

Favorable Environmental Effects

Project installation will reduce average annual floodwater damages in the protected area by 51 percent in agricultural areas and by 99 percent in nonagricultural areas (\$49,250 to \$1,400).

Land treatment measures on the uplands will reduce cropland sheet and gully erosion from 3.1 to 2.8 tons per acre per year.

Reduction of erosion in concert with sediment trapped behind the installed dams will reduce downstream turbidity.

Land treatment and structural measures will reduce sediment in the streams by about 2,600 tons per year, resulting in improved fish habitat.

A 48-acre sediment pool with a shoreline of 1.9 miles will be created. The pool will eventually become a wetland marsh. An estimated 17 acres of wetland will be in the dry sediment pool at FRS No. 2

The level of Long Lake will be stabilized resulting in reduced flooding to 51 properties along the lake.

Flooding will be eliminated or reduced for 38 homes, 18 commercial buildings, and 3 agricultural properties along Spring Creek.

Adverse Environmental Effects

Approximately 90 acres of land will be used for dams, spillways, and sediment pools. About 131 acres may be flooded when storm water is temporarily stored.

Two miles of intermittent stream will be covered or inundated by the dams and sediment pools. One-half mile of intermittent stream will be changed in conjunction with the Long Lake structure.

FRS No. 1 will release warmer water affecting 1 mile of Spring Creek between the dam and Brillion Iron Works. The dams and spillways at FRS No. 1 and FRS No. 2 will destroy an estimated 2 and 6 acres of wetlands, respectively. Approximately 35 acres of wetlands will be inundated by the wet sediment pool at FRS No. 1. The dry sediment pool at FRS No. 2 contains 10 acres of wetlands that will remain wetlands.

The new structure at Long Lake will lower the water elevation about 0.3 foot. This will result in a slightly smaller lake area.

ALTERNATIVES

Various combinations of structural and nonstructural measures were considered, including those suggested by interested agencies, groups, and individuals. The more significant alternatives considered to solve the water and related land resource problems were:

- 1. Continuation of the present trends.
- 2. Accelerated land treatment only.
- 3. Accelerated land treatment, flood plain zoning, and floodproofing of existing buildings subject to flood damage.
- 4. Accelerated land treatment, flood plain zoning, and flood plain evacuation.
- 5. Accelerated land treatment, flood plain zoning, one floodwater retarding structure, Long Lake outlet structure, and construction of a bypass channel to divert Spring Creek around Brillion.
- 6. Accelerated land treatment, flood plain zoning, two floodwater retarding structures, Long Lake outlet structure, and channel work on Spring Creek.
- 7. Accelerated land treatment, flood plain zoning, two floodwater retarding structures; Long Lake outlet structure, and a multiple-purpose flood control and agricultural water management channel.

Continuation of the present trends in the use of the watershed will result in part of the land treatment being installed. Some reduction in erosion and sediment damage can be expected, but there will be no measurable reduction in floodwater damages. If the project is not installed, an estimated \$32,265 of net average annual benefits would be foregone. This is the estimated average annual benefits, \$52,120, less the estimated average annual cost of the proposed project, \$19,855.

Eliminating all structural measures from the plan and installing only the planned conservation land treatment would have the same beneficial effect in the upland areas, but floodwater damages would be reduced by less than one percent. This alternative would leave Brillion and the Long Lake residents with a continuing threat of flooding.

Consideration was given to a nonstructural program of zoning flood prone areas allowing only compatible use. About 30 acres of the flood-prone area has extensive development. Most of the homes and many of the businesses, notably the Brillion Iron Works, are not readily adaptable to floodproofing. Floodproofing existing buildings would cost in excess of \$3 million. The level of protection would be low.

A change from urban to less intensive use, such as flood plain zoning and moving the homes and businesses out of the flood plain, would eliminate most of the flood damage potential. The cost of relocating 89 homes and 18 businesses would exceed \$30 million.

Installation of conservation land treatment systems supplemented by flood plain zoning, a floodwater retarding structure, an outlet structure for Long Lake, and a bypass channel or floodway to divert Spring Creek flood flows around Brillion would meet the sponsor's objectives. Structural works will reduce floodwater and sediment damages by about 99 percent in Brillion and the Long Lake summer home area. Installation of these structural measures would affect approximately 60 acres of cropland, 53 acres of grassland, and 2 acres of forest land, along with the associated upland game habitat. The estimated cost of installing this combination of structural measures is \$1,065,200.

Installation of conservation land treatment systems supplemented by flood plain zoning, two floodwater retarding structures, an outlet structure for Long Lake, and channel work on Spring Creek would reduce urban flood damages. No outlet would be provided for surface and subsurface drainage of croplands. The Long Lake outlet structure, the land treatment, and urban flood damage reduction will remain the same. This proposal would require that one bank of Spring Creek within Brillion be disturbed. Several large trees would be removed. Several bridges would be enlarged or replaced. Construction of the channel work would be annoying to nearby residents because of the noise and dust. Installation of these structural measures would affect approximately 120 acres of cropland, 86 acres of grassland, and 14 acres of forest land along with the associated upland game habitat. The estimated cost of installing this combination of structural measures is \$560,000.

Installation of conservation land treatment systems supplemented by flood plain zoning, two floodwater retarding structures, an outlet structure for Long Lake, and a multiple-purpose flood control and agricultural water management channel would best meet the sponsor's original objectives. The land treatment, Long Lake outlet. and urban floodwater damage reduction will remain the same. The multiple-purpose channel will be located where no channel now exists. It will provide a drainage outlet for 850 acres of cropland, reduce flood damages on an additional 200 acres of farmland, and protect the proposed industrial park on the west side of Brillion. This channel would require the installation of new bridges at U.S. Highway 10, Chicago and Northwestern Railroad and Center Street. The installation of these structural measures will affect approximately 140 acres of cropland, 90 acres of grassland, and 8 acres of forest land. The estimated cost of installing this combination of structural measures is \$835,000.

SHORT-TERM VS. LONG-TERM USE OF RESOURCES

Brillion watershed is within the Northwestern Lake Michigan subarea, as delineated by the Water Resources Council. The 1972 OBERS projection shows a 44 percent population increase by the year 2000 for the subarea. The city of Brillion has increased in population by 45 percent in the last 10 years and by 116 percent in the last 40 years. The town of Brillion has increased 5 and 4 percent for the same periods. Therefore, it is expected that the city of Brillion will be expanding in the future. The rural watershed will continue to be used for agricultural production. Much of the city of Brillion yet to be developed is in lower lying areas. The two flood retarding structures will provide long-term flood protection for the city. It will require that present and future agricultural production from the structure sites and pool areas be foregone or reduced.

The project will reduce options for long-term land use only on areas incorporated into the dams, spillways, sediment pools, and flood pools. It is compatible with the long-term land use trends of the adjacent land resources and will help to build more stability into the economic system. Ground water resources and air resources are not expected to be impaired.

Other long-term benefits of the project will be: to increase the level of economic activity in the city and adjacent areas by providing greater purchasing power; to improve the economic stability; and to provide for the maximum development of the Brillion watershed. Resource losses will be minor and in the form of land needed to construct and operate the floodwater retarding structures and Long Lake structure. Much of this land can be utilized for purposes compatible with operation of the structures. These uses could include wildlife management, selected agriculture, and woodlot development. Land treatment measures, when installed, will provide for preservation of the soil and water resources over the long term and allow reasonable use through time. The completed project is expected to be effective in conserving land and water resources long after its designed life. The degree of flood prevention will remain high. Sediment control will continue after the designed life of the structure, especially if hydrologic conditions are improved beyond those proposed in this project or if sediment is removed from the storage areas provided at each site.

Brillion watershed is located in the Southeast Wisconsin Rivers basin. It was included in the water and related land resource study of that basin.

The project will fulfill part of the purposes and goals of the recommendations of that study.

Long-term environmental effects within the watershed will include the improvement of water quality and wildlife habitat. These amenities are due to the effect of land treatment and to the reduction of stream turbidity.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Approximately 15 acres of cropland and 9 acres of grassland will be committed to the dams and spillways with the installation of the project. Vegetal cover will change to grassland. Use will be limited to wildlife habitat.

About 20 acres of cropland, 31 acres of grassland, 8 acres of forest land, and 6 acres of other land will be committed to the sediment pools. Use will change to 17 acres of grassland and 48 acres of water surface.

An estimated \$537,970 of capital is required to install project measures. This includes the cost of constructing two floodwater retarding structures and the Long Lake structure. These structures will require the commitment of about 130 cubic yards of concrete, 14,000 pounds of steel, 320 cubic yards of sand filter, 200 feet of 24- and 30-inch reinforced concrete pipe, 15 feet of steel pipe, 900 feet of 6-inch diameter drain pipe, and 16 man-years of labor.

No other permanent commitment of resources is known to be required.

CONSULTATION AND REVIEW WITH APPROPRIATE

AGENCIES AND OTHERS

General

The Calumet County and the Manitowoc County Soil and Water Conservation Districts agreed in March and August of 1968 to serve as the sponsoring local organization for the Brillion watershed. The application for planning assistance was endorsed by the Brillion City Council, Brillion Iron Works, Ariens Company, Brillion Lions Club, Zander Press, Calumet County Bank, Brillion Conservation Club, and Brillion Chamber of Commerce. The towns of Brillion, Rantoul, Maple Grove, and Rockland also endorsed the application. Written notices of meetings and requests for information about the watershed were issued by the sponsors. Public meetings, steering committee meetings, and planning and coordinating meetings of the sponsors with State and local agencies were held. In February 1969 the application for assistance was approved by the Wisconsin Board of Soil and Water Conservation Districts. It was submitted to the U.S. Department of Agriculture, Soil Conservation Service, in March 1969.

A preliminary investigation was made by the watershed staff of the Soil Conservation Service in Wisconsin and it was reported in September 1969 that the project appeared to be feasible. A watershed association was formed in April 1970. In October 1970, the sponsoring local organization, the watershed association, and interested agencies were informed that planning authorization had been given to the Soil Conservation Service in Wisconsin to assist the local sponsors with the development of a work plan for watershed protection, flood prevention, and agricultural water management. The development of this work plan was accomplished with the assistance of public meetings, steering committee meetings, and with assistance from State and local agencies. The State Historical Preservation Officer has been consulted. Ten radio announcements, one 15-minute television program, and newspaper coverage of about 2,500 column inches have been used to inform the public of the planning progress.

The Brillion watershed was investigated during the Southeast Wisconsin Rivers basin study and recognized as a project meriting early action.

Discussion and Disposition of Each Comment on Draft Statement

Comments were requested from the following agencies:

Federal Power Commission

Office of Economic Opportunity

U.S. Department of the Army

U.S. Department of Commerce

U.S. Department of Health, Education, and Welfare

U.S. Department of the Interior

U.S. Department of Transportation

U.S. Environmental Protection Agency

Advisory Council on Historic Preservation

Wisconsin Board of Soil and Water Conservation Districts

Wisconsin Department of Administration

Wisconsin Department of Natural Resources

State Historic Preservation Officer

Bay-Lakes Regional Planning Commission

East Central Wisconsin Regional Planning Commission

Responses were received from the U.S. Department of the Army; U.S. Department of Health, Education, and Welfare; U.S. Department of the Interior; U.S. Department of Transportation; U.S. Environmental Protection Agency; Advisory Council on Historic Preservation; the Wisconsin Board of Soil and Water Conservation Districts; the Wisconsin Department of Administration; and the Wisconsin Department of Natural Resources.

Summary of Comments and Responses

Each issue, problem, or objection is summarized and a response given on the following pages. Comments are serially numbered to correspond with the original letters. The letters of comment appear in appendix C.

U.S. Department of the Army

(1) Comment: We have reviewed the work plan and foresee no conflict

with any projects or current proposals of this Department. The draft environmental (impact) statement is

considered to be satisfactory.

Response: None.

U.S. Department of Health, Education, and Welfare

(1) Comment: To our knowledge, and based upon the information pro-

vided, this project will not impact to any significant degree on the health, education, or welfare of the

population.

Response: None.

U.S. Department of the Interior - Comments were received on both the work plan and the environmental impact statement.

Work Plan Comments

(1) Comment:

Implementation of the proposed work plan should result in relatively minor impacts on fish and wild-life resources. Some marsh and upland habitat will be lost in creation of the sediment pools, but more marsh habitat will be created than destroyed. Stabilization of Long Lake at a crest level of 3 inches lower than the present lake level should not adversely affect fish spawning.

Response: None.

(2) Comment:

We strongly support the proposed accelerated land treatment measures for the 4,626 acres of the watershed not now adequately protected. Completion of these measures will result in overall improvement of the local environment. The proposed treatment for grasslands and forestlands will be beneficial to wildlife.

Response: None.

(3) Comment:

The second paragraph of page 71 is in error. The official report of the U.S. Fish and Wildlife Service was submitted to the State Conservationist on July 27, 1970, rather than in September 1969.

Response:

Concur. The sentence containing this information has been corrected.

(4) Comment:

The U.S. Fish and Wildlife Service report included a recommendation that the sediment pools be fenced to protect them from livestock. The State Conservationist responded to this in a letter dated July 25, 1974, by stating "livestock have not been using the area and no problem is anticipated". Whether or not cattle will be grazed in this area in the future cannot be anticipated. Creation of a wet sediment pool might prove to be conducive to usage as a livestock watering hole. The plan should include provisions to either obtain perpetual easements or enact adequate zoning regulations to preclude disturbance of the sediment pools by livestock.

Response:

Livestock have not grazed at site #1 for about 10 years or at site #2 for over 25 years. To insure that there will be no grazing at either site in the future, the Calument County Soil and Water Conservation District intends to include a livestock exclusion clause in the conservation plan which will be developed for each site. The conservation plan is normally attached to and becomes a part of the operation and maintenance agreement developed for each structure as noted on page 60 of the work plan and page 13 of the E.I.S.

E.I.S. Comments

(1) Comment:

The draft statement is generally adequate in its discussion of fish and wildlife values. However, we do suggest that adverse effects on non-game species of wildlife resulting from the 1/2 mile of stream work should be discussed.

Response:

The proposed stream work below the Long Lake outlet structure will have no significant adverse effect on non-game species of wildlife.

(2) Comment:

Any adverse effects the floodwater retarding structures may have on the spring recharge of water into the marsh south of Brillion also should be addressed.

Response:

There is no evidence that the brief detention of floodwater has any measurable effect on spring flow. In theory, detention would increase the opportunity for ground water recharge, which in turn could increase spring flow.

(3) Comment:

The statement notes on page 8 (under Structural Measures) that most of the borrow will be within the area required for the structure and flood pool and that additional land rights will be needed for the remainder of the borrow. This section should be expanded to indicate the location of those additional lands, the amount of material to be borrowed, and any environmental impacts which may result from borrowing.

Response:

It is anticipated that all 65,100 cubic yards of borrow will be obtained within the area required for the structures and flood pools. If a small amount of additional borrow is needed, it will be taken immediately adjacent to the structure sites. Borrow areas will be temporarily stripped of vegetation, but will be revegetated immediately after removal of the fill material. See page 10 for measures to be taken during construction to minimize soil erosion and water, air, and noise pollution.

U.S. Department of Transportation

(1) Comment: The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. We have no comments to offer nor do we have any objection to this project.

Response: None.

U.S. Environmental Protection Agency

(1) Comment: We have classified our comments as Category LO-1. Specifically, this means we have no objectives to the project and we believe the environmental impacts of the project are adequately addressed in the E.I.S. The classification and the date of our comments will appear in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions.

Response: None.

Advisory Council on Historic Preservation

(1) Comment: Pursuant to its responsibilities under Section 102
(2) (c) of the National Environmental Policy Act of
1969, the Advisory Council on Historic Preservation
has determined that while you have discussed the
historical, architectural, and archeological aspects
related to the undertaking, your environmental
statement is procedurally inadequate. Your final
statement should include a copy of your correspondence with the State Historic Preservation Officer
and should indicate more clearly that the U.S.
Department of Agriculture has accepted responsibility for the determination of effect made on page 44.

Response: A copy of the letter concurrence from the State Historic Preservation Officer regarding the effects of proposed project action has been included in appendix C. The archeological report referred to in the letter is on file at the Soil Conservation Service State Office and the State Historical Society of Wisconsin. The report concludes that although "a few prehistorical artifacts were found in disturbed excavation..., construction will not adversely affect artifact remains." The wording on page 44 has been revised to clearly indicate U.S. Department of Agriculture responsibility for the determination of effect.

Wisconsin Board of Soil and Water Conservation Districts

(1) Comment:

Seven alternatives to solve the water and related land resource problems in varying degree, have been proposed. The present goals of the sponsors appear to be satisfactorily planned for, and the Board interprets the proposed work plan as carrying out the alternative, number six. Given assurance that the project can be funded by the Federal Government, the sponsors and the Brillion Watershed Association have repeatedly stated their intention of fulfilling their responsibility concerning the project.

The Board is unaware of adverse impact upon the shortterm or long-term use of resources, if the proposed work plan is carried out. It should be noted that the Board expects that flood plain zoning will be in effect for current conditions, at the time that the project is begun.

The irreversible and irretrievable commitments of resources do not appear unreasonable.

The Board therefore concurs with the draft statement and the proposed work plan.

Response:

None.

Wisconsin Department of Administration

(1) Comment: We are concerned that the dam as designed will divert all overflow through the City of Brillion.

Response: No water will be diverted as a result of project action.

(2) Comment: We are concerned that significant state costs are implied in conjunction with the Long Lake fishery improvement, and that inadequate emphasis has been placed upon the utilization of flood plain zoning to encourage wise land management and reduce the need for structural protection measures.

We understand that these concerns have also been expressed by the Department of Natural Resources. We recommend you work closely with the DNR to satisfactorily resolve these concerns which should be addressed both in the final Environmental Impact Statement and the Watershed Work Plan.

Response:

These concerns have been resolved. See the following comment by the Wisconsin Department of Natural Resources.

Wisconsin Department of Natural Resources

(1) Comment: Reference is made to our July 24, 1974, review comments

of the Preliminary Draft and to your response to those comments dated August 9, 1974. Based on your response and the revisions incorporated in this draft, we are satisfied that our concerns have been adequately considered.

Response: None.

(2) Comment: The project as presently proposed should provide major

flood protection without significant adverse environmental

effect.

Response: None.

LIST OF APPENDIXES

- Appendix A Comparison of Benefits and Costs for Structural Measures
- Appendix B Figure 1 Structural Details General
 Figure 2 Structural Details Site 1
 Figure 3 Structural Details Site 2
 Figure 4 Flood Map Watershed
 Figure 5 Flood Map Brillion
 Figure 6 Project Map
- Appendix C Letters of Comment Received on the Draft Environmental Impact Statement

Approved by

Richard W. Akeley State Conservationist

keley Date 3/27/75

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- (16) Wisconsin Department of Natural Resources, Scientific Areas Preservation Council, <u>Wisconsin Scientific Areas</u>, 1970.
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- (18) Benzschawel, A., Garrow, P., Guthrie, B., Miller, D., Brillion High School, <u>Unpublished Water Quality Data</u> for Spring Creek, 1972-1973.
- (19) Becker, R., Behnke, K., Coonen, C., de Arteaga, T.,
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 for Spring Creek, 1973-1974.

General References

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- Hubbs, C.L., and Lagler, K.F., Fishes of the Great Lakes Region, University of Michigan Press, Ann Arbor, Michigan, 213 pages, 1958.
- Conant, R., A Field Guide to Reptiles and Amphibians of Eastern

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- Gromme, O.J., <u>Birds of Wisconsin</u>, The University of Wisconsin Press, Madison, Wisconsin, 219 pages, 1964.
- Jackson, H.T., <u>Mammals of Wisconsin</u>, The University of Wisconsin Press, Madison, Wisconsin, 504 pages, 1961.
- U.S. Dept. of Agriculture, Soil Conservation Service

 Economic Guide for Watershed Protection and Flood Prevention

 National Engineering Handbook, Section 3, Sedimentation

 National Engineering Handbook, Section 4, Hydrology

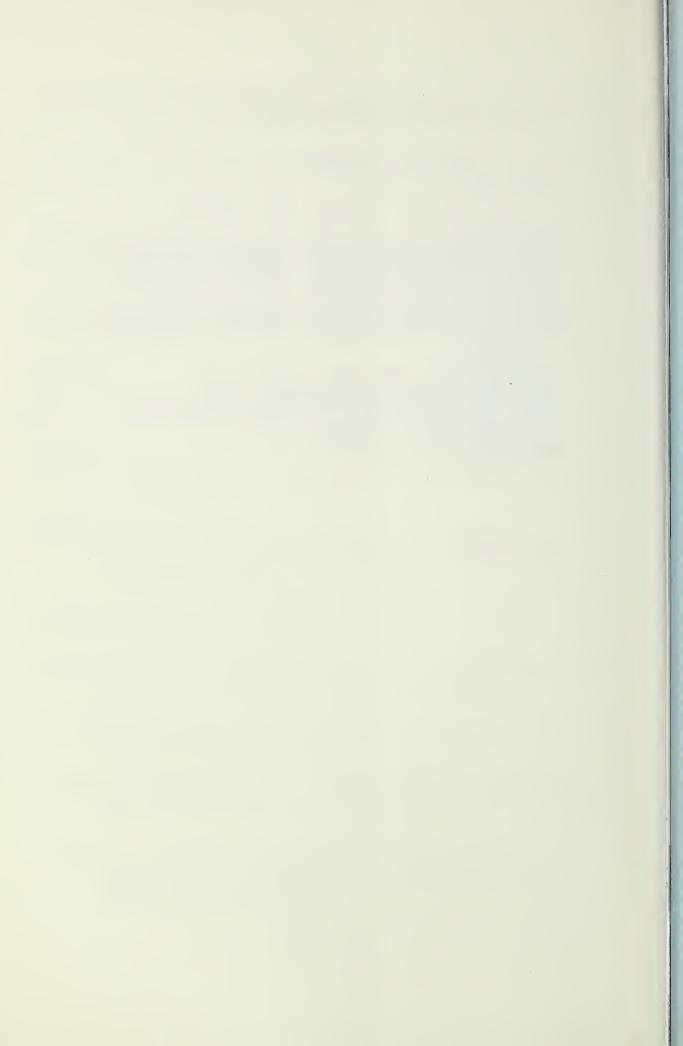
 National Engineering Handbook, Section 5, Hydraulics

 National Engineering Handbook, Section 6, Structural Design

 National Engineering Handbook, Section 8, Engineering

 Geology

Washington Engineering Memorandum, 1-78
Washington Watershed Memorandum, 1-125
Washington Environmental Memorandum, 1-14
Washington Technical Releases, 1-40
Watershed Protection Handbook



APPENDIX A

Comparison of Benefits and Costs for Structural Measures



COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES
BRILLION WATERSHED, WISCONSIN
(Dollars)

	Average Annual Benefit-Cost Cost 3/ Ratio	13,640 3.3:1.0	4,000 1.8:1.0	2,215	19,855 2.6:1.0	
AVERAGE ANNUAL BENEFITS 1/	Total	45,090	7,030		52,120	
	Secondary	3,740	290		4,330	
	Damage Reduction	41,350	6,440		47,790 2/	
	Evaluation Unit	Floodwater Retarding Structures 1 and 2	Long Lake Outlet Structure	Project Administration	GRAND TOTAL	

Price base: adjusted normalized prices, April 1966, for agricultural damages and current prices for nonagricultural damages. Price base:

In addition, it is estimated that land treatment will provide flood damage reduction benefits of \$60 annually. 72

Price base: installation-1973, amortized at 5 5/8 percent interest; ORM-adjusted normalized prices, April 1966. <u>س</u>



APPENDIX B - Figure 1 - Structural Details - General

Figure 2 - Structural Details - Site 1

Figure 3 - Structural Details - Site 2

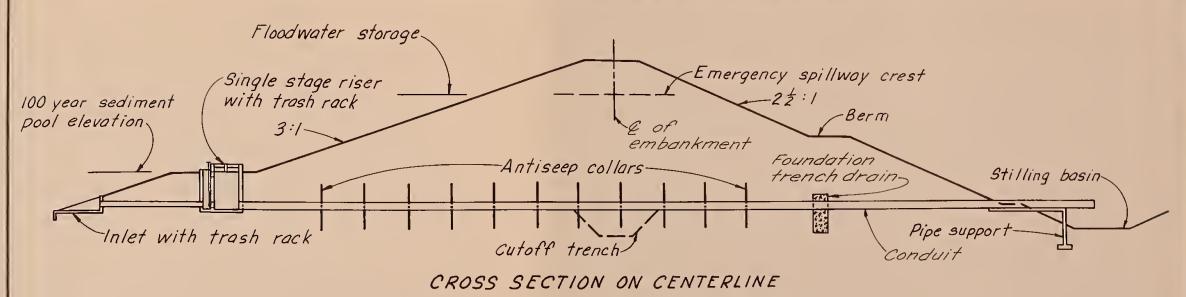
Figure 4 - Flood Map - Watershed

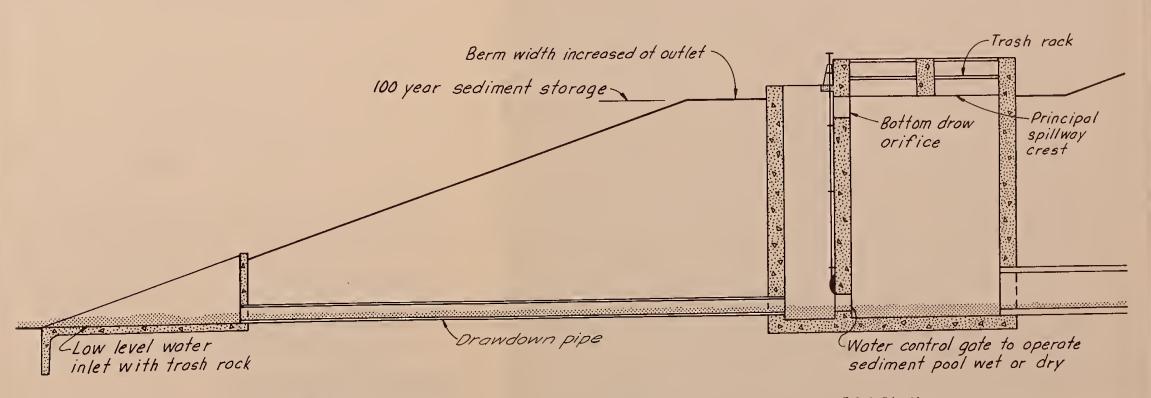
Figure 5 - Flood Map - Brillion

Figure 6 - Project Map



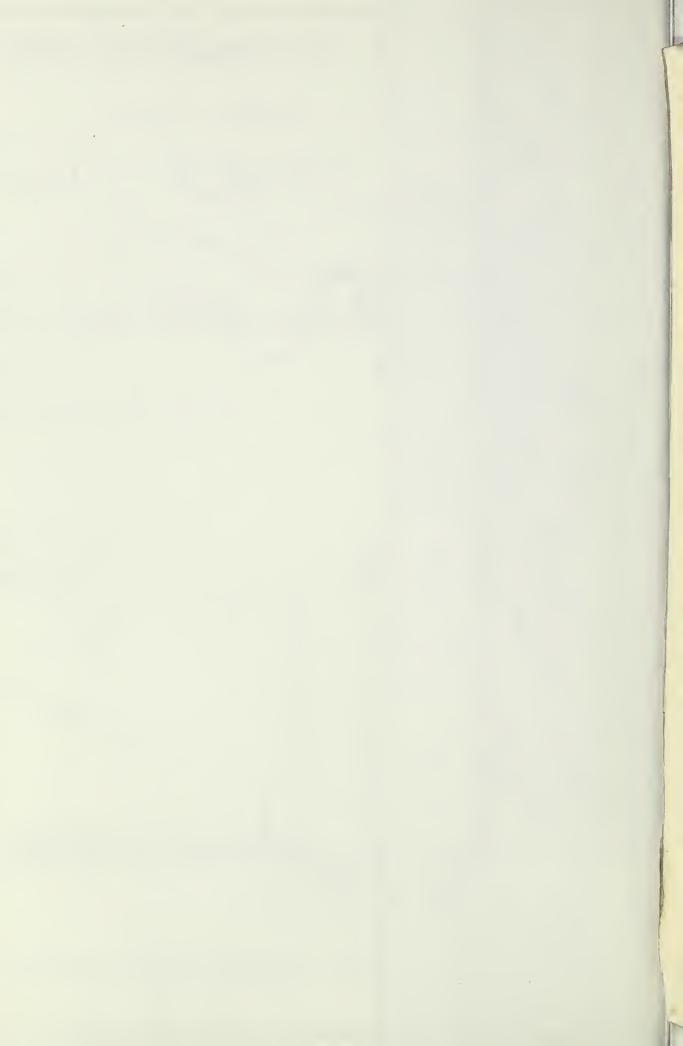
FIGURE 1- TYPICAL FLOODWATER RETARDING STRUCTURE

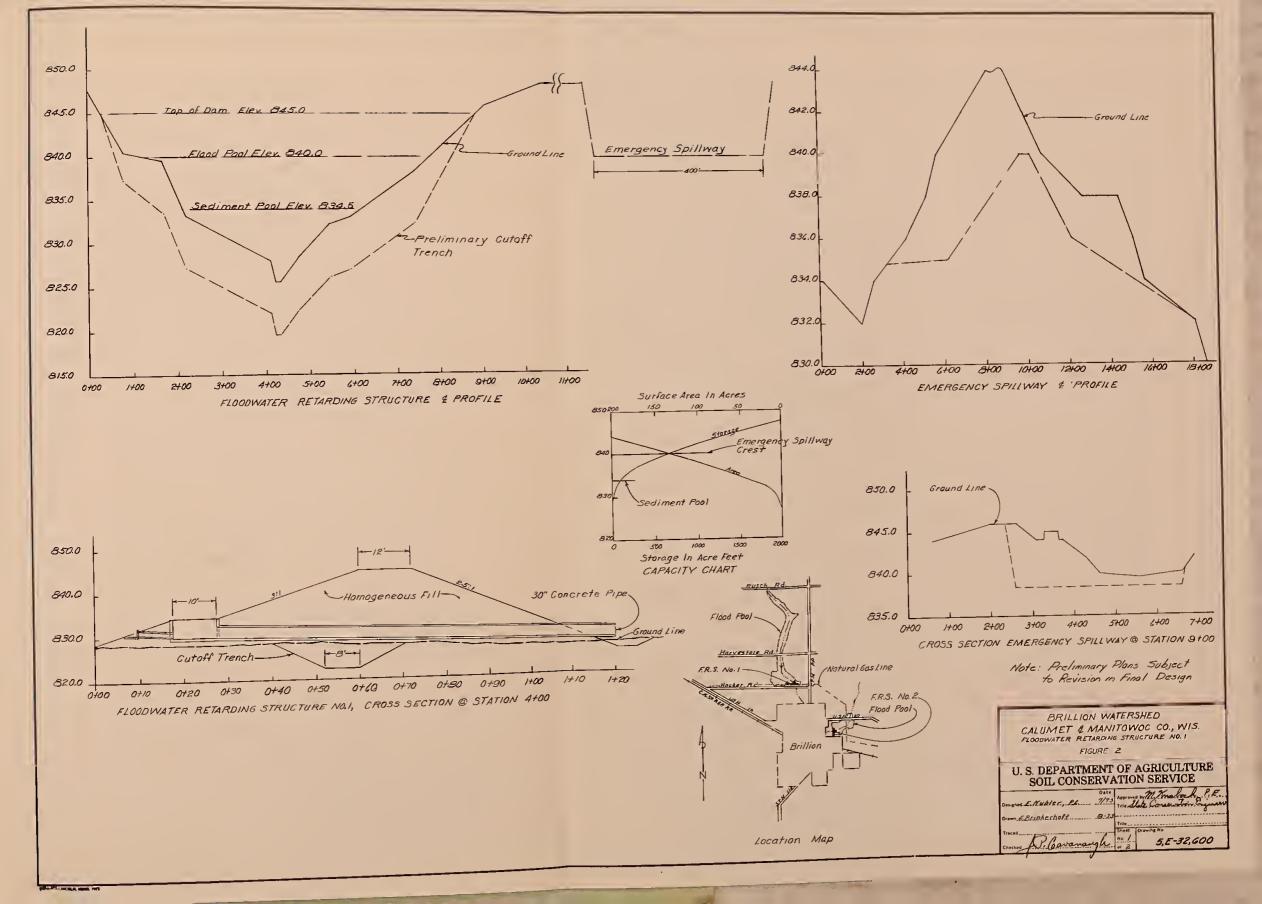


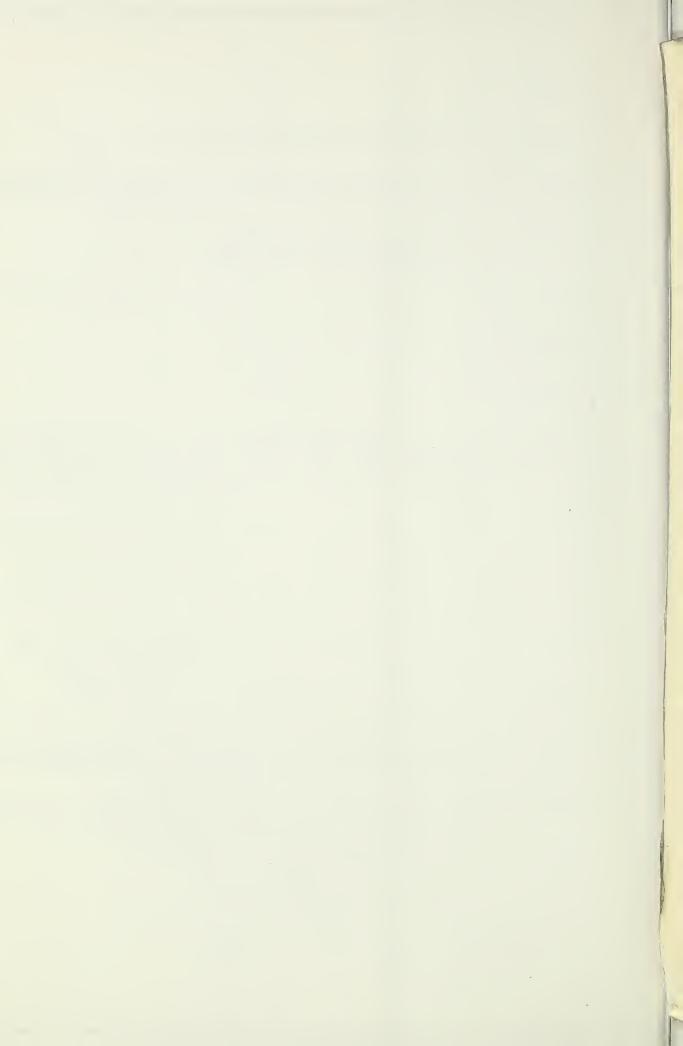


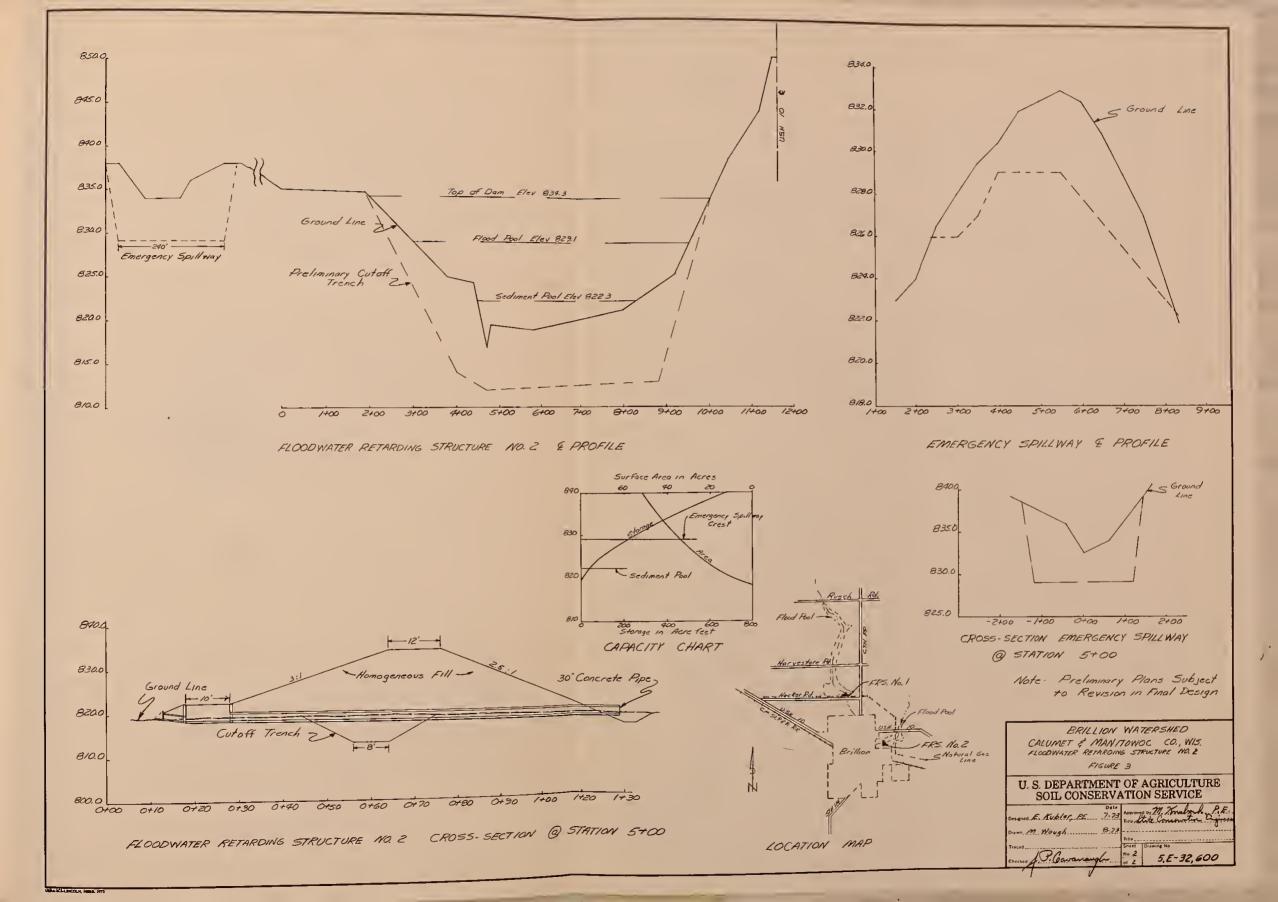
INLET WORKS SHOWING WET OR DRY SEDIMENT POOL OPERATION

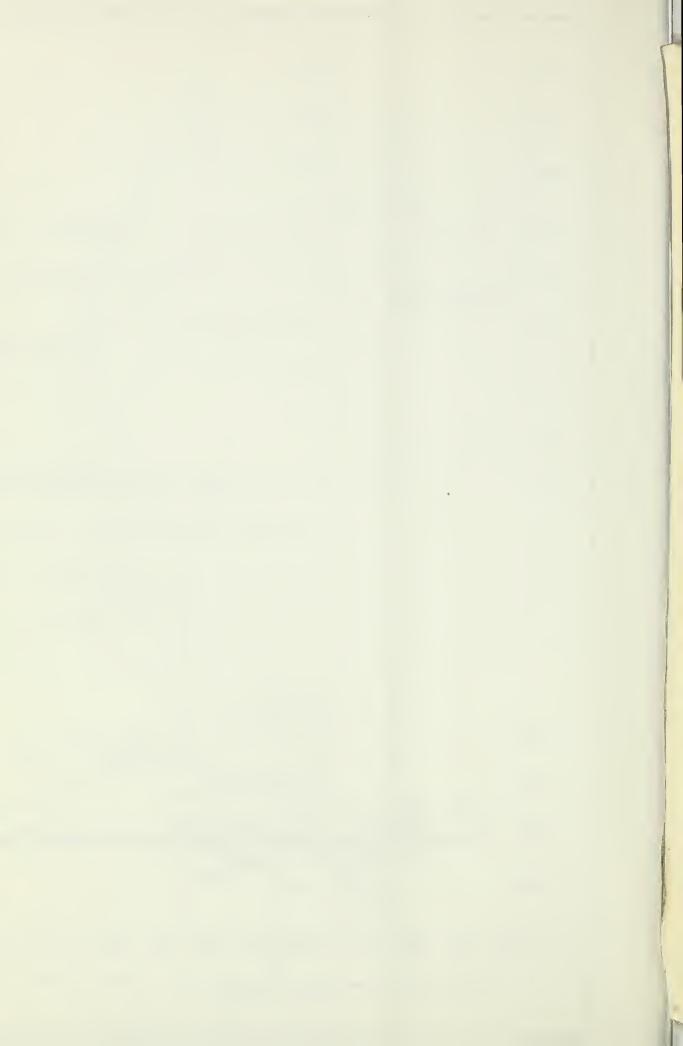
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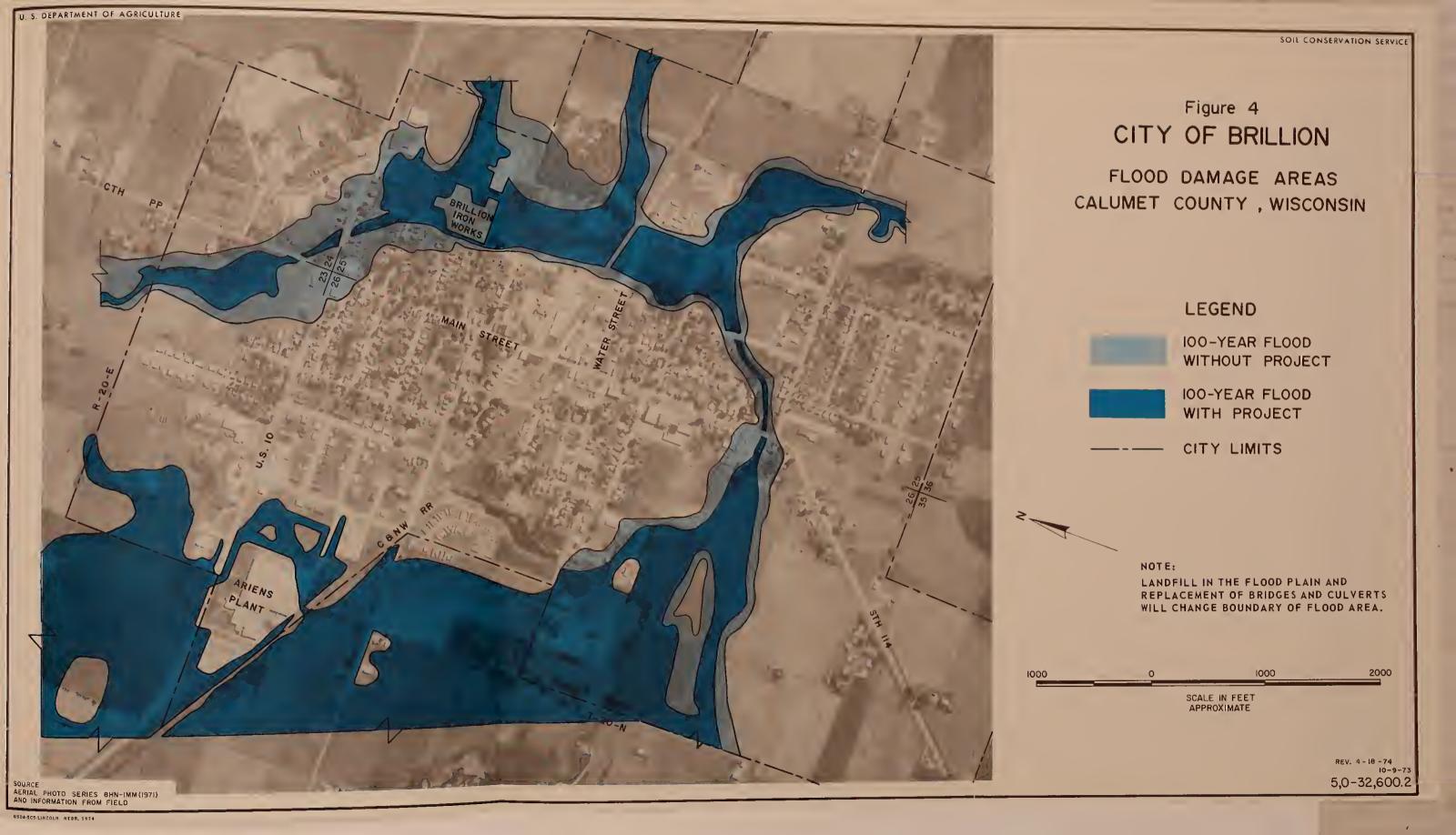


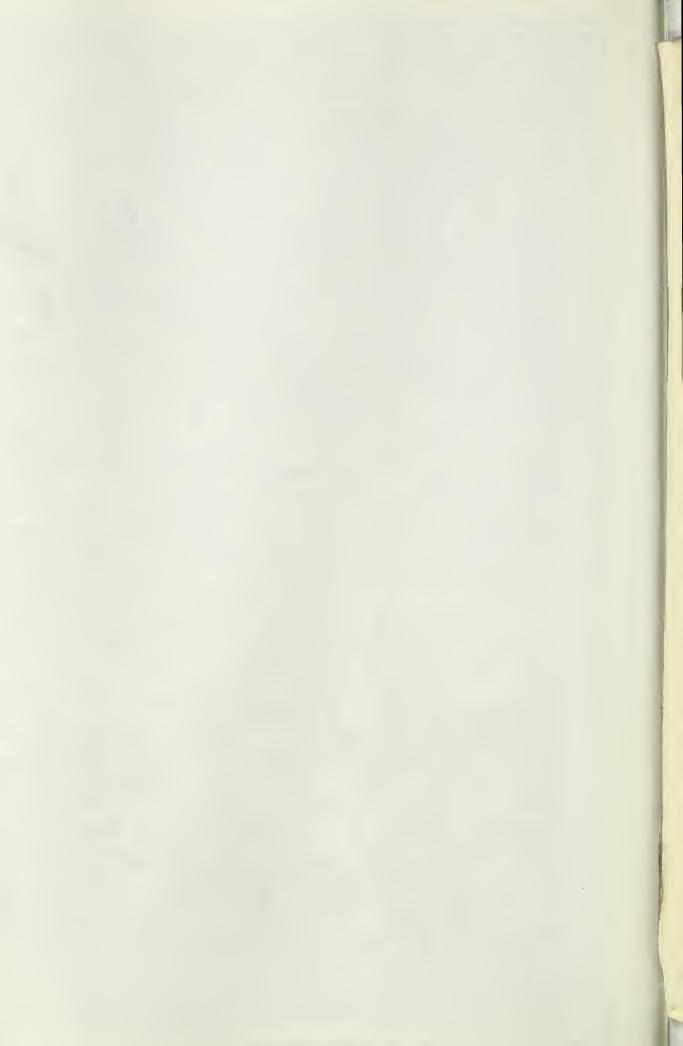


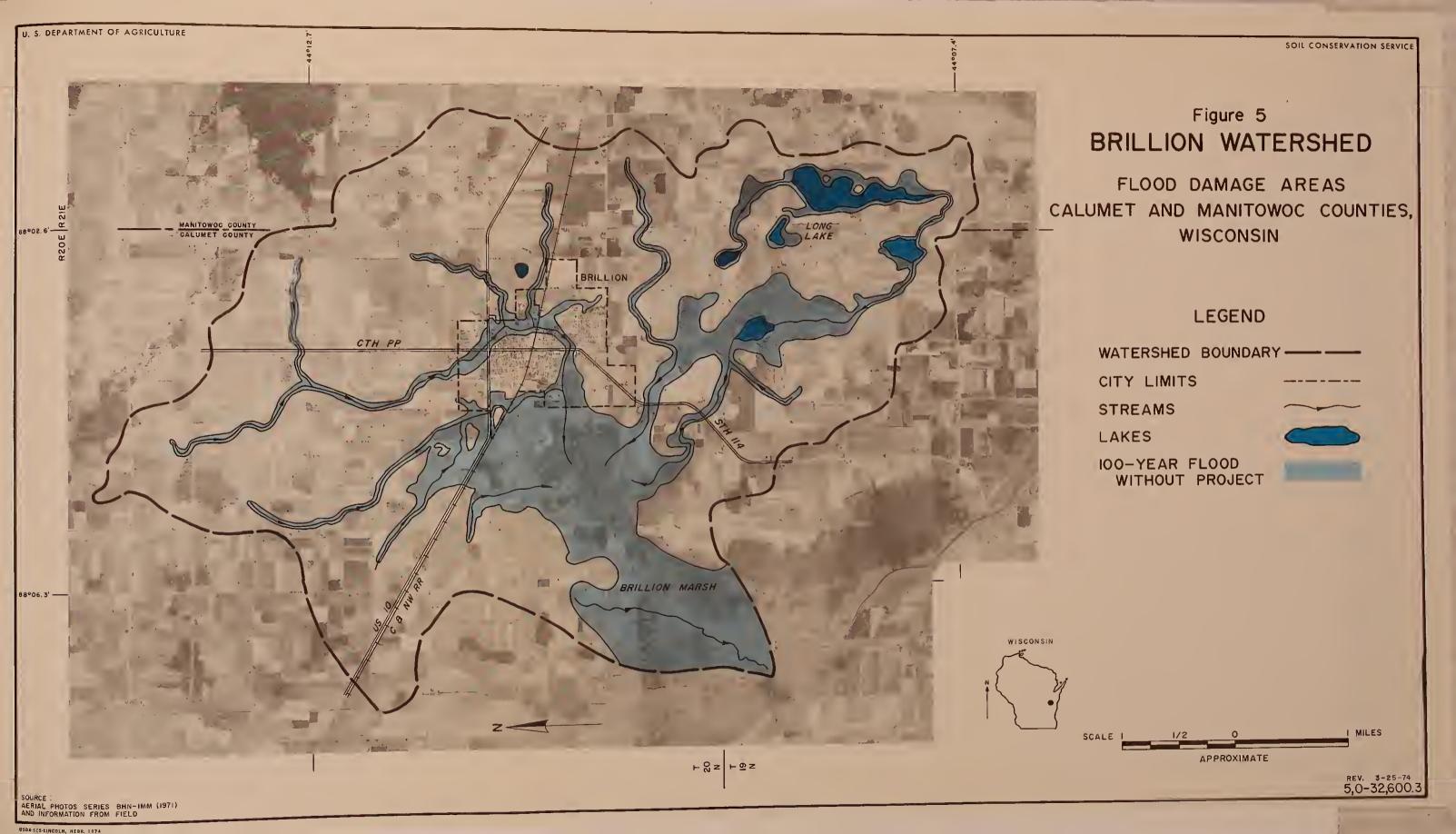


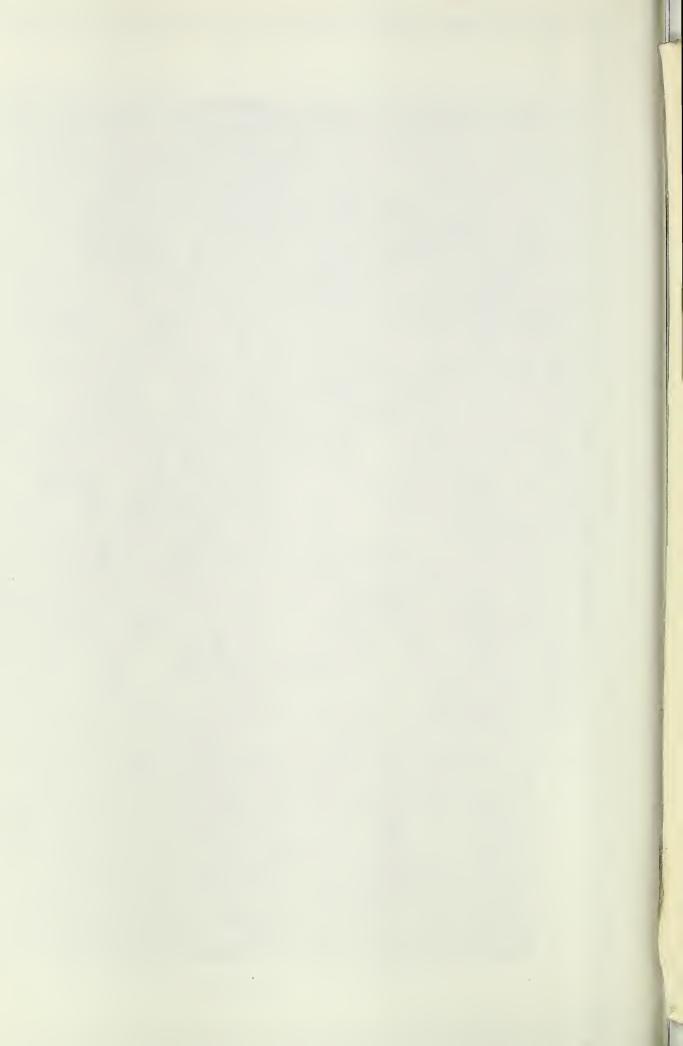


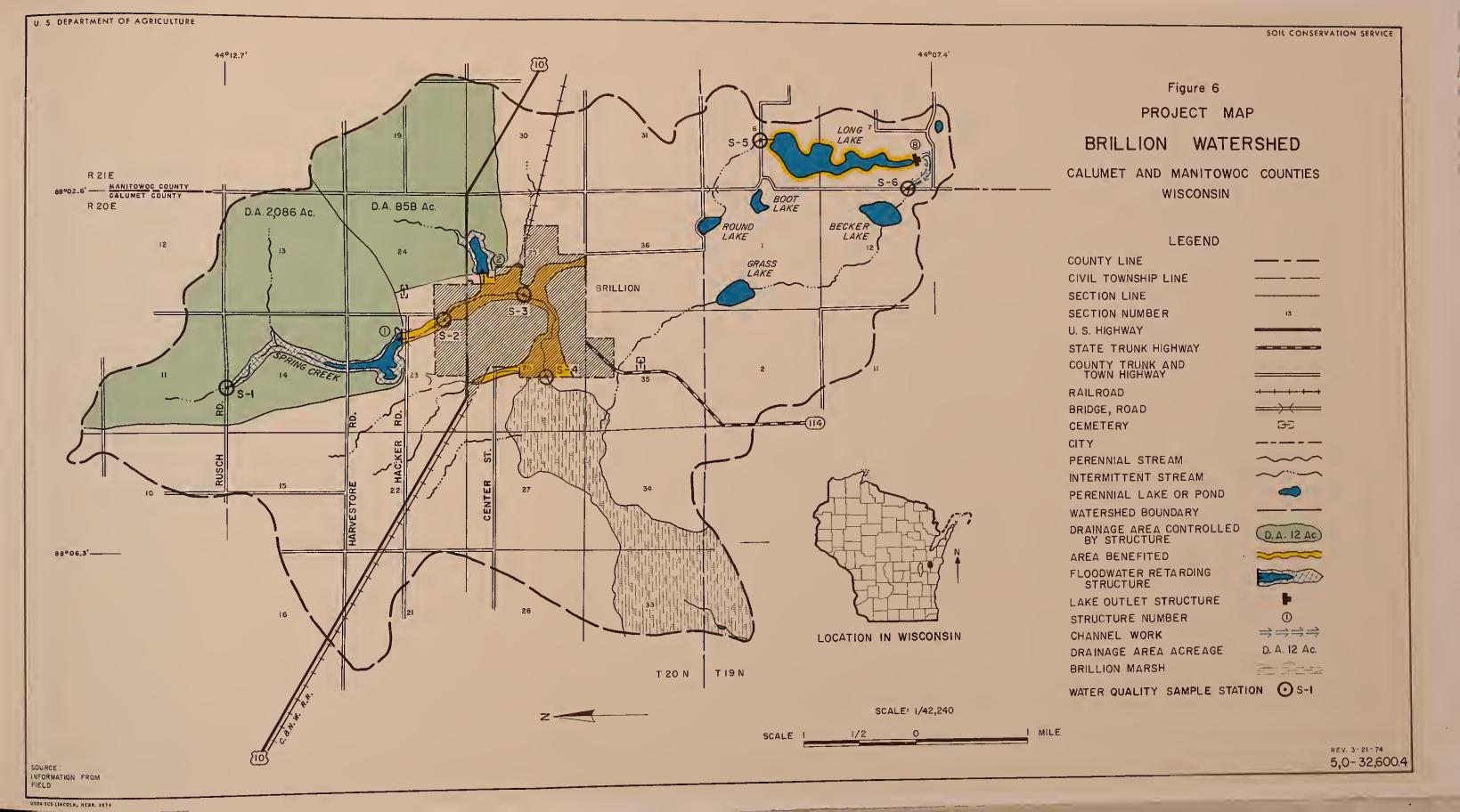
















DEPARTMENT OF THE ARMY

OFFICE OF THE CHIEF OF ENGINEERS WASHINGTON, D.C. 20314

27 February 1975

Mr. Orville J. Berry
Acting State Conservationist
United States Department of Agriculture
Soil Conservation Service
P. O. Box 4248
Madison, Wisconsin 53711

Dear Mr. Berry:

In compliance with the provisions of Section 5 of Public Law 566, 83d Congress, the views of the Secretary of the Army were requested for the Watershed Work Plan and Draft Environmental Statement for Brillion Watershed, Calumet and Manitowoc Counties, Wisconsin.

We have reviewed the work plan and foresee no conflict with any projects or current proposals of this Department.

The draft environmental statement is considered to be satisfactory.

Sincerely,

MARVIN W. REES

Colonel, Corps of Engineers
Executive Director of Civil Works

W Rees





DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

REGION V

300 SOUTH WACKER DRIVE CHICAGO, ILLINOIS 60606

OFFICE OF THE REGIONAL DIRECTOR

December 19, 1974

Mr. Orville J. Berry
Acting State Conservationist
Soil Conservation Service
Department of Agriculture
P.O. Box 4248
Madison, Wisconsin 53711

RE: Draft Environmental Impact Statement
Brillion Watershed

Calumet and Manitowoc Counties, Wisconsin

Dear Mr. Berry:

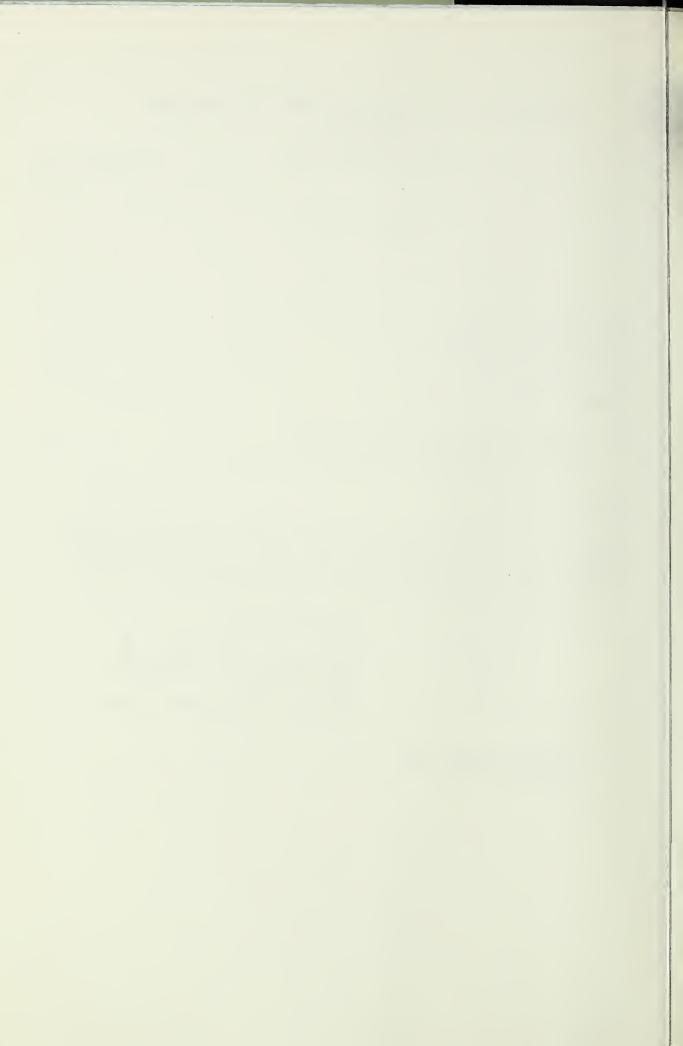
We have reviewed the Draft Environmental Impact Statement for the above project. To our knowledge, and based upon the information provided, this project will not impact to any significant degree on the health, education or welfare of the population.

Sincerely yours,

Robert A. Ford

Regional Environmental Officer

cc: Charles Custard, OEA Warren Muir, CEQ





United States Department of the Interior

OFFICE OF THE SECRETARY

Mr. Richard W. Akeley State Conservationist Soil Conservation Service P.O. Box 4248 Madison, Wisconsin 53711

Dear Mr. Akeley:

Thank you for your letter of October 25, 1974, requesting our views and comments on a work plan and draft environmental statement for the Brillion Watershed, Calumet and Manitowoc Counties, Wisconsin. We have completed our review of these two documents and will provide you with our comments on the work plan, followed by our comments on the draft environmental impact statement.

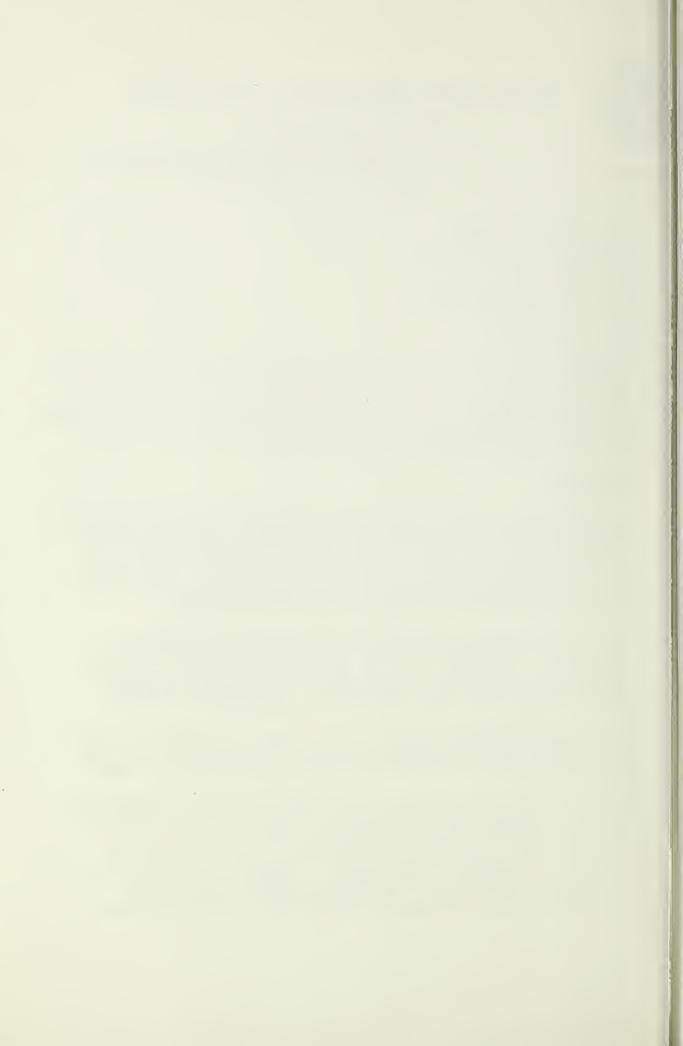
WORK PLAN

Implementation of the proposed work plan should result in relatively minor impacts on fish and wildlife resources. Some marsh and upland habitat will be lost in creation of the sediment pools but more marsh habitat will be created than destroyed. Stabilization of Long Lake at a crest level of 3 inches lower than the present lake level should not adversely affect fish spawning.

We strongly support the proposed accelerated land treatment measures for the 4,626 acres of the watershed not now adequately protected. Completion of these measures will result in overall improvement of the local environment. The proposed treatment for grasslands and forestlands will be beneficial to wildlife.

The second paragraph of page 71 is in error. The official report of the U.S. Fish and Wildlife Service was submitted to the State Conservationist on July 27, 1970 rather than in September 1969.

The U.S. Fish and Wildlife Service report included a recommendation that the sediment pools be fenced to protect them from livestock. The State Conservationist responded to this in a letter dated July 25, 1974, by stating "livestock have not been using the area and no problem is anticipated." Whether or not cattle will be grazed in this area in the future cannot be anticipated. Creation of a wet sediment pool might prove to be conducive to



usage as a livestock watering hole. The work plan should include provisions to either obtain perpetual easements or enact adequate zoning regulations to preclude disturbance of the sediment pools by livestock.

DRAFT ENVIRONMENTAL STATEMENT

The draft statement is generally adequate in its discussion of fish and wildlife values. However, we do suggest that adverse effects on non-game species of wildlife resulting from the ½ mile of stream work should be discussed. Any adverse effects the floodwater retard structures may have on the spring recharge of water into the marsh south of Brillion also should be addressed.

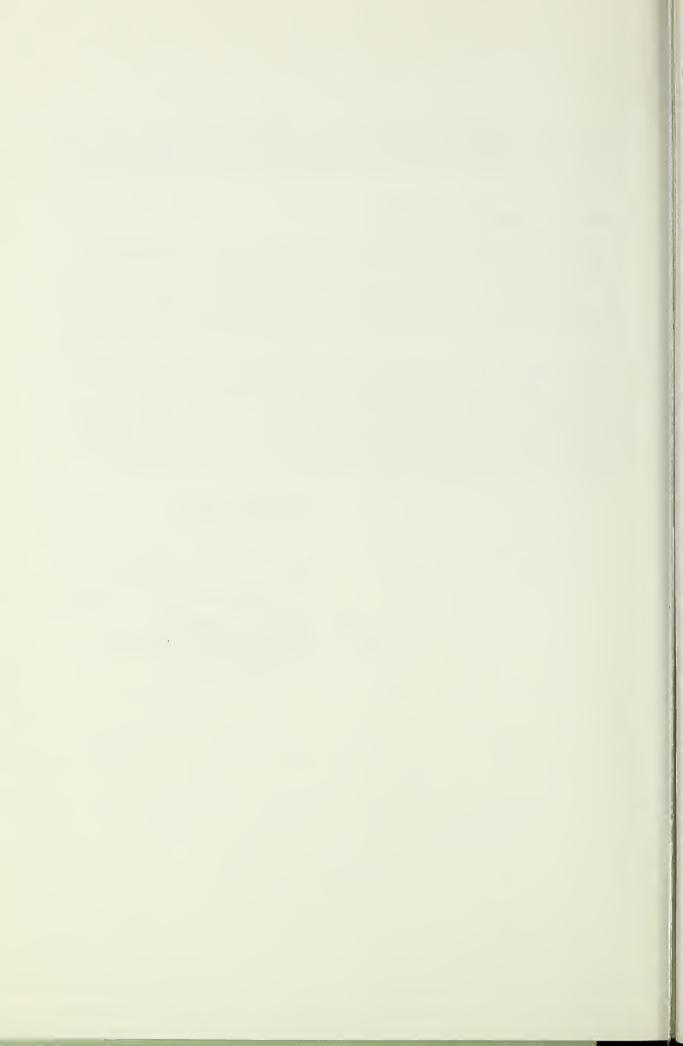
The statement notes on page 8 (under Structural Measures) that most of the borrow will be within the area required for the structure and flood pool and that additional land rights will be needed for the remainder of the borrow. This section should be expanded to indicate the location of those additional lands, the amount of material to be borrowed, and any environmental impacts which may result from borrowing.

Sincerely yours,

Madonna F. McGrath

Acting Special Assistant

to the Secretary





DEPARTMENT OF TRANSPORTATION UNITED STATES COAST GUARD

mailing address: u.s. coast guard $_{\rm G^-WS}/73)$ 400 seventh street sw. washington, d.c. 20590 phone: (202) 426-2262

· 2 6 DEC 1974

Mr. Richard W. Akeley State Conservationist Soil Conservation Service P. O. Box 4248 Madison, Wisconsin 53711

Dear Mr. Akeley:

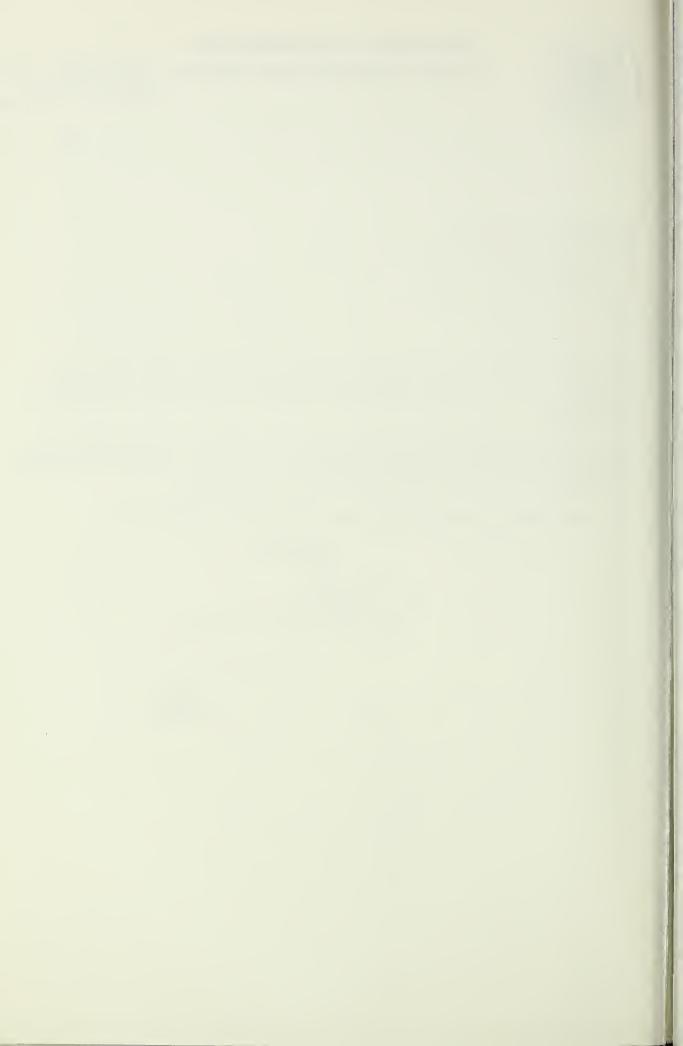
This is in response to your letter of 25 October 1974 addressed to Commandant, U. S. Coast Guard concerning a draft environmental impact statement for the Brillion Watershed, Calumet and Manitowoc Counties, Wisconsin.

The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. We have no comments to offer nor do we have any objection to this project.

The opportunity to review this draft statement is appreciated.

Sincerely,

The second secon





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION V

230 SOUTH DEARBORN STREET CHICAGO, ILLINOIS 60604

DEC 20 1974

Mr. Richard W. Akeley State Conservationist U. S. Department of Agriculture Soil Conservation Service P. O. Box 4248 Madison, Wisconsin 53711

Dear Mr. Akeley:

In response to your letter of October 25, 1974, we have reviewed the Draft Environmental Impact Statement (EIS) for the Brillion Watershed, Calumet and Manitowoc Counties, Wisconsin. We have classified our comments as Category LO-1. Specifically, this means we have no objections to the project and we believe the environmental impacts of the project are adequately addressed in the EIS. The classification and the date of our comments will appear in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions.

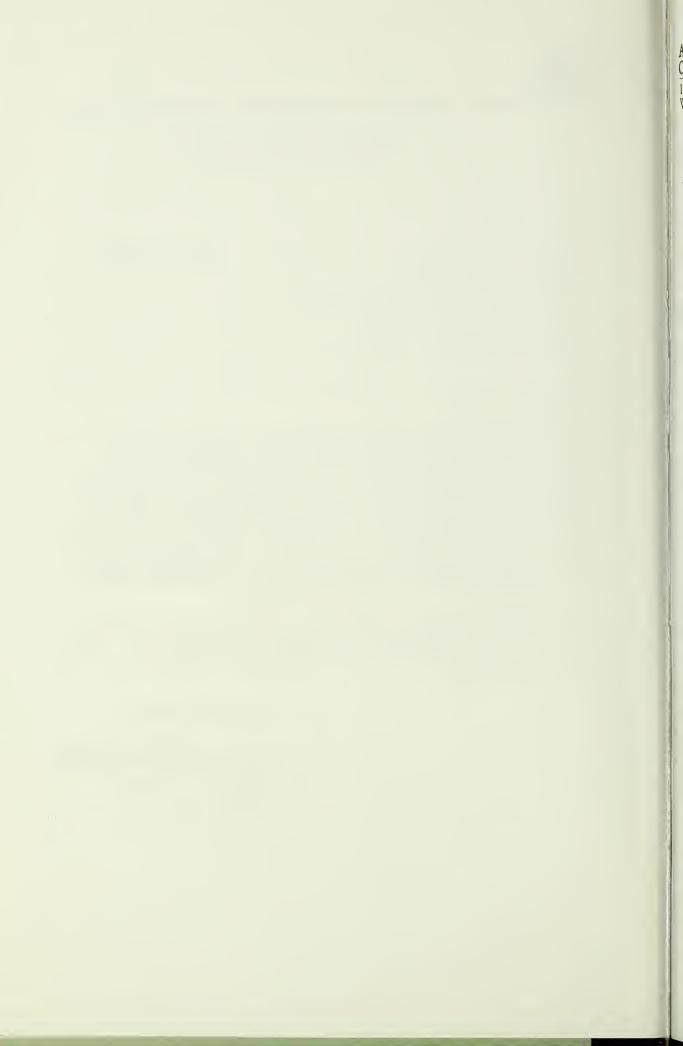
Our previous comments dated July 17, 1974 on the preliminary Draft EIS were adequately addressed in the Draft EIS. Thank you for providing us with the opportunity to express our views on the project.

Sincerely yours,

Donald A. Wallgren

Chief

Federal Activities Branch



Advisory Council On Historic Preservation 1522 K Street N.W. Suite 430 Washington D.C. 20005

December 26, 1974

Mr. Richard W. Akeley State Conservationist U.S. Department of Agriculture Soil Conservation Service P.O. Box 4248 Madison, Wisconsin 53711

Dear Mr. Akeley:

This is in response to your request of October 25, 1974; for comments on the environmental statement and watershed work plan for Brillion Watershed, Calumet and Manitowoc Counties, Wisconsin. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that while you have discussed the historical, architectural, and archeological aspects related to the undertaking, your environmental statement is procedurally inadequate.

Your final statement should include a copy of your correspondence with the State Historic Preservation Officer and should indicate more clearly that the U.S. Department of Agriculture has accepted responsibility for the determination of effect made on page 44.

We have no comment to make on the watershed work plan.

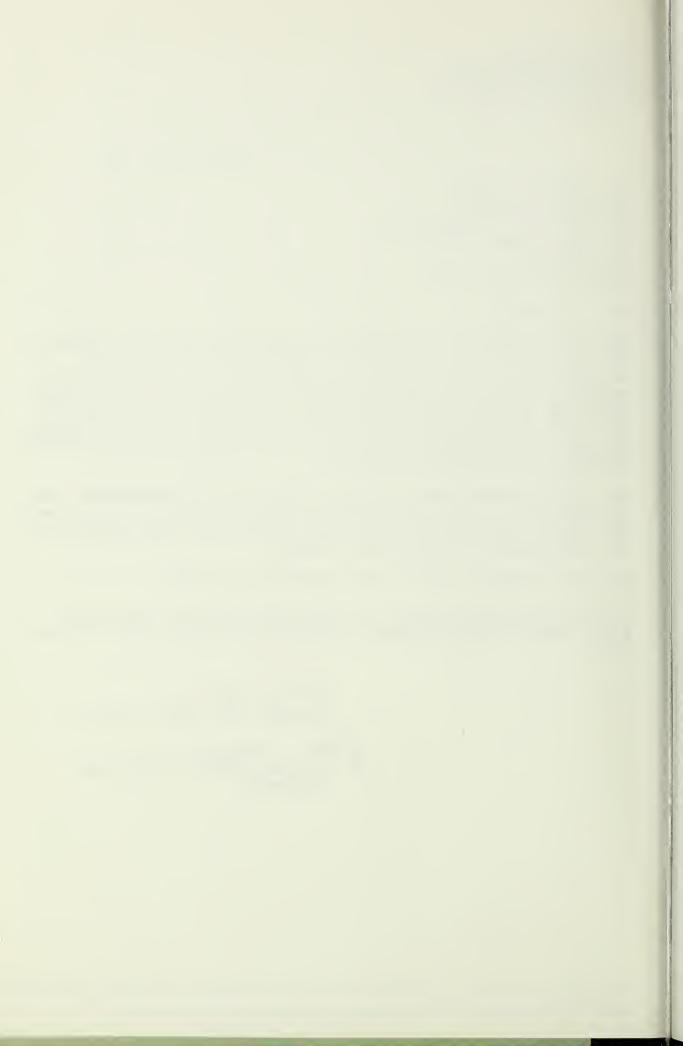
Should you have any questions or require any additional assistance, please contact Stephen Cochran of the Advisory Council staff at 202-254-3974.

> Sincerely yours, Jodan & Tannenhaum

John D. McDermott

Director, Office of Review and

Compliance



STATE OF WISCONSIN BOARD OF SOIL AND WATER CONSERVATION DISTRICTS

1815 UNIVERSITY AVENUE MADISON, WISCONSIN 53706 TEL. (608) 262-2634

January 20, 1975

Mr. Richard Akeley State Conservationist Soil Conservation Service 4601 Hammersley Road Madison, Wi 53711

Dear Mr. Akeley:

The draft Environmental Impact Statement (dated 04-16-74) for the Brillion Watershed in Calumet and Manitowoc Counties, Wisconsin has been reviewed by Representatives of the Wisconsin Board of Soil and Water Conservation Districts.

The Soil and Water Conservation Districts of Calumet and Manitowoc Counties are sponsors of this project, which would involve federal assistance provided under authority of Public Law 83-566, 83rd Congress, 68 Stats. 666, as amended.

Seven alternatives to solve the water and related land resource problems in varying degree, have been proposed. The present goals of the sponsors appear to be satisfactorily planned for, and the Board interprets the proposed work plan as carrying out the alternative, number six. Given assurance that the project can be funded by the Federal Government, the sponsors and the Brillion Watershed association have repeatedly stated their intention of fulfilling their responsibility concerning the project.

The Board is unaware of adverse impact upon the short-term or long-term use of resources, if the proposed work plan is carried out. It should be noted that the Board expects that floodplain zoning will be in effect for current conditions, at the time that the project is begun.

The irreversible and irretrievable commitments of resources do not appear unreasonable.

The Board therefore concurs with the draft statement and the proposed work plan.

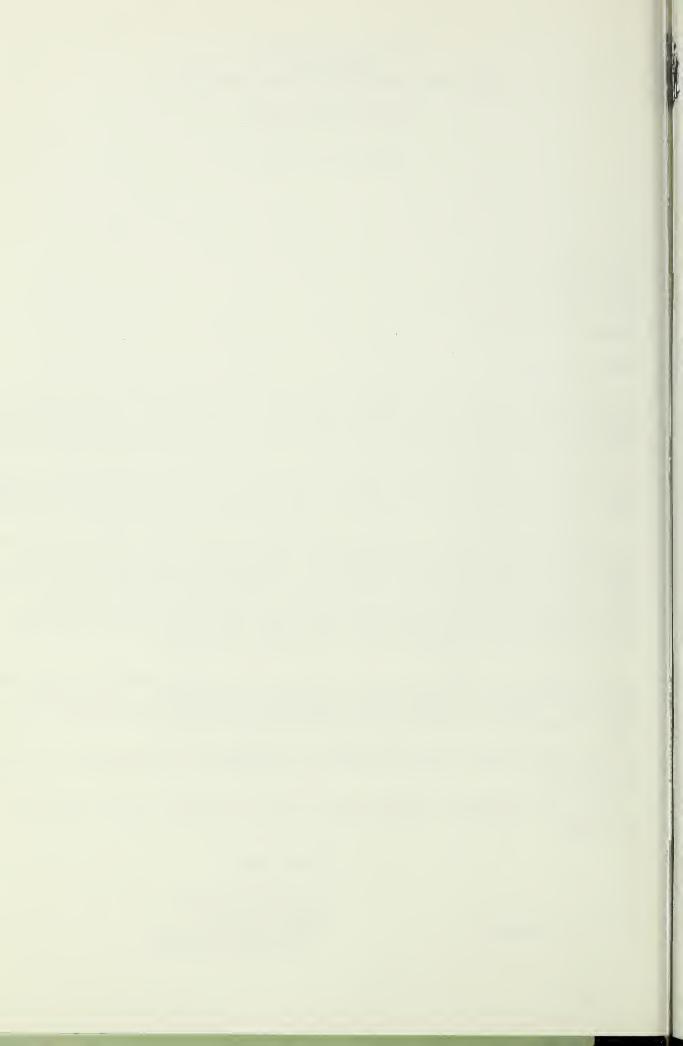
Yours truly

Consider Linder Sons Donald Niendorf

BSWCD Representative on behalf of BSWCD

DN/sv

cc: Pat Cavanaugh





State of Wisconsin \ DEPARTMENT OF ADMINISTRATION

STATE BUREAU OF PLANNING AND BUDGET

STATE PLANNING OFFICE Stephen M. Born, Director 1 WEST WILSON STREET MADISON, WISCONSIN 53702 (608) 266-7958

January 7, 1975

Mr. J. P. Cavanaugh River Basin-Watershed Staff Leader Soil Conservation Service P.O. Box 4248 Madison, Wisconsin 53711

Re: Draft Brillion Watershed Work Plan and Environmental Impact Statement

Dear Mr. Cavanaugh:

The Bureau of Planning and Budget, of the Department of Administration, has reviewed the above report. We are concerned that the dam as designed will divert all overflow through the city of Brillion, that significant state costs are implied in conjunction with the Long Lake fishery improvement, and that inadequate emphasis has been placed upon the utilization of flood-plain zoning to encourage wise land management and reduce the need for structural protection measures.

We understand that these concerns have also been expressed by the Department of Natural Resources. We recommend you work closely with the DNR to satisfactorily resolve these concerns which should be addressed both in the final Environmental Impact Statement and the Watershed Work Plan.

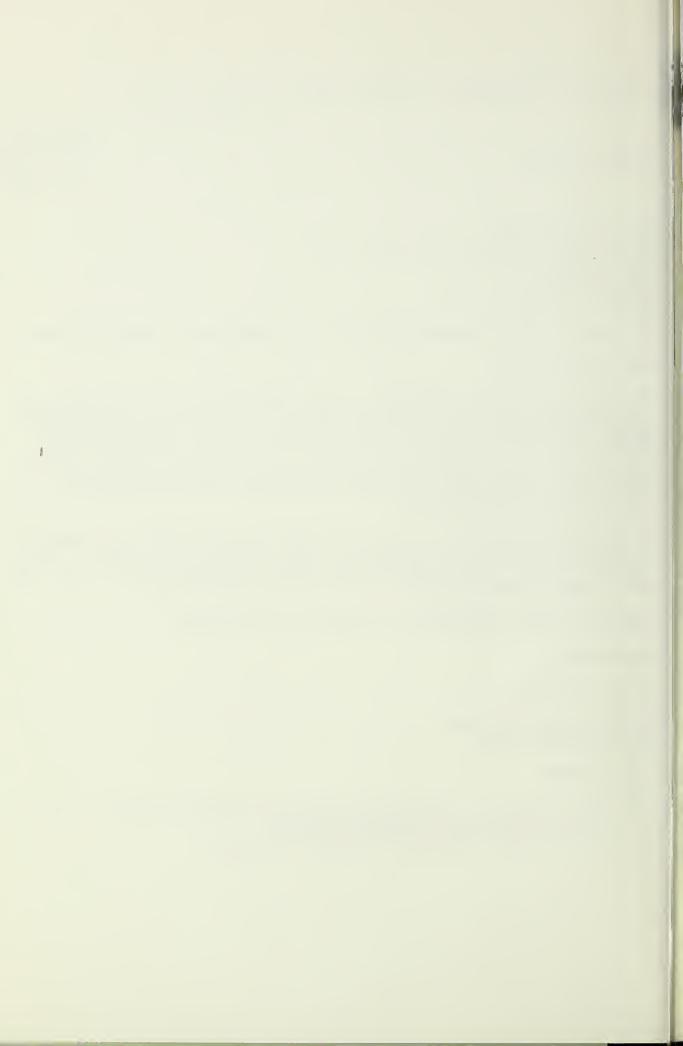
Thank you for the opportunity to comment on this project.

Respectively,

Ronald J. Paska, Planner State Planning Office

RJP:cs-2/1468

cc: Roy C. Willey, Jr., East Central Wisconsin Regional Planning Commission Tom Lee, Department of Natural Resources C. W. Threinen, Department of Natural Resources



ř

L. P. Voigt Secretary

January 15, 1975

BOX 450 MADISON, WISCONSIN 53701

IN REPLY REFER TO: 2600
Brillion Watershed, Calumet Co.

Mr. Richard W. Akeley State Conservationist Soil Conservation Service P. O. Box 4248 Madison, Wisconsin 53711

Dear Mr. Akeley:

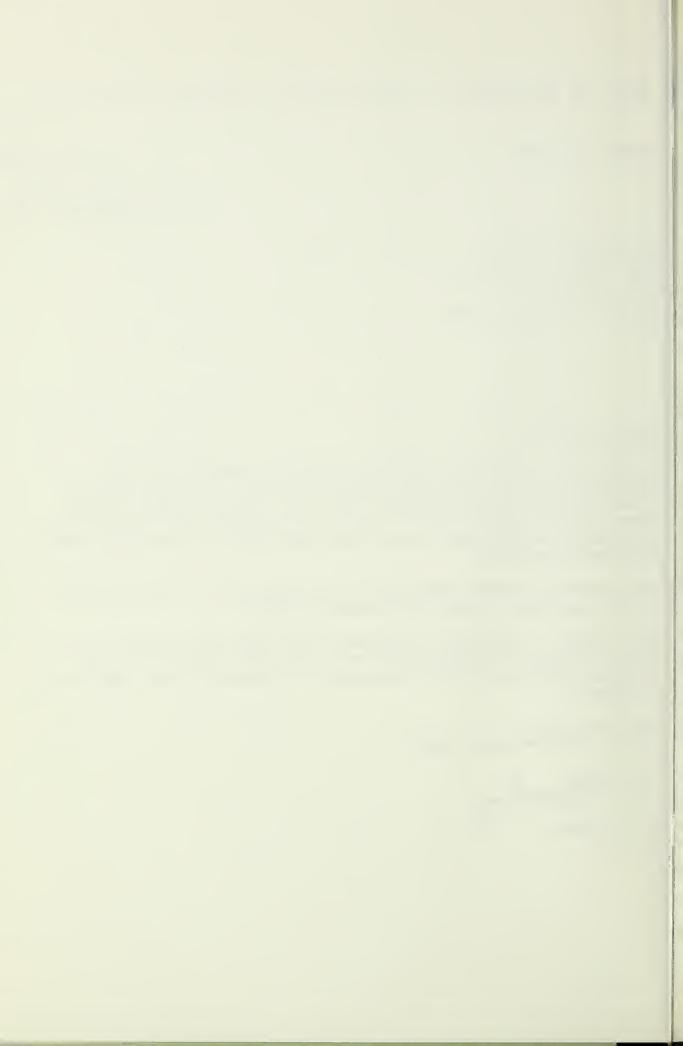
We have reviewed the Draft Environmental Impact Statement for the Brillion Watershed. Relatedly, reference is made to our July 24, 1974 review comments of the Preliminary Draft and to your response to those comments dated August 9, 1974. Based on your response and the revisions incorporated in this Draft, we are satisfied that our concerns have been adequately considered.

The project as presently proposed should provide major flood protection without significant adverse environmental effect.

This review is limited to the adequacy of the Draft EIS and shall not be implied as approval of the project for construction permits or other statutory requirements of the Department. We appreciate this opportunity to comment.

Very truly yours, Bureau of Environmental Impact

C. D. Besadny
Director



THE STATE HISTORICAL SOCIETY OF WISCONSIN

816 STATE STREET / MADISON, WISCONSIN 53706 / JAMES MORTON SMITH, DIRECTOR

Office of the Director

July 2, 1974

Mr. Richard W. Akeley
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 4248
Madison, Wisconsin 53711

Brillion Watershed Work Plan

Dear Mr. Akeley:

We have reviewed the preliminary draft copy of the Brillion Watershed Work Plan and the Draft Environmental Impact Statement for the project. Our records indicate that there are no known historic sites which will be affected by the project. However, no architectural survey has been conducted in Brillion.

A field survey for archeological sites has been completed by the State Historical Society of Wisconsin and a report submitted to your office.

Sincerely,

James Morton Smith

State Historic Preservation

Officer |

JMS:dk

cc: Brillion Historical Society
Manitowoc County Historical Society
Calumet County Historical Society

